

*Next
Year
From A+
to A+*

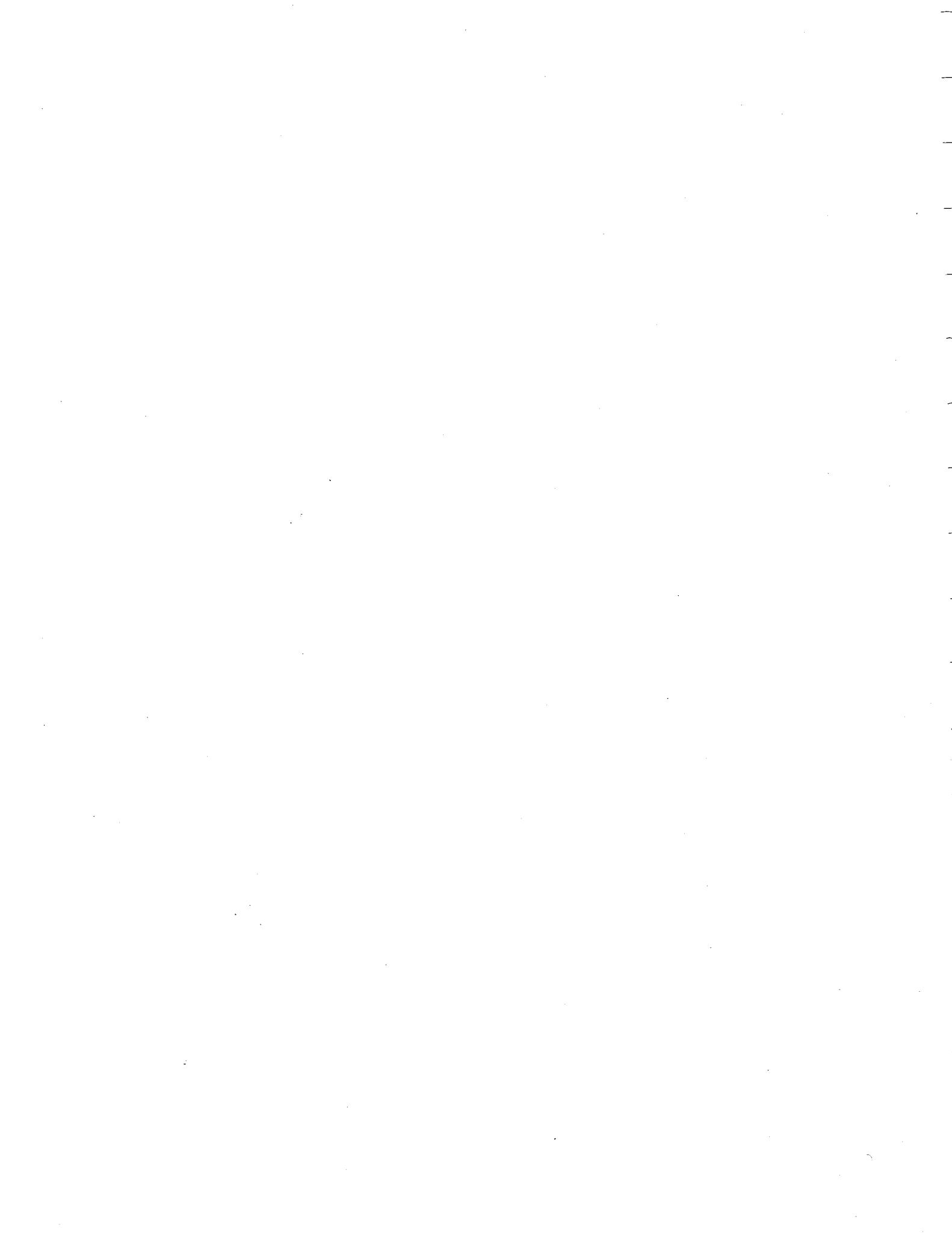
GENERATING COMPETITION

Equity, Reliability and Lowest Price



Municipal Electric Association







Municipal Electric Association

January 26, 1996

Hon. Donald S. Macdonald, P.C., C.C., Chair
Advisory Committee on Competition in Ontario's Electric System
40 St. Clair Ave. West
Toronto, Ontario
M4V 1M2.

Dear Mr. Macdonald:

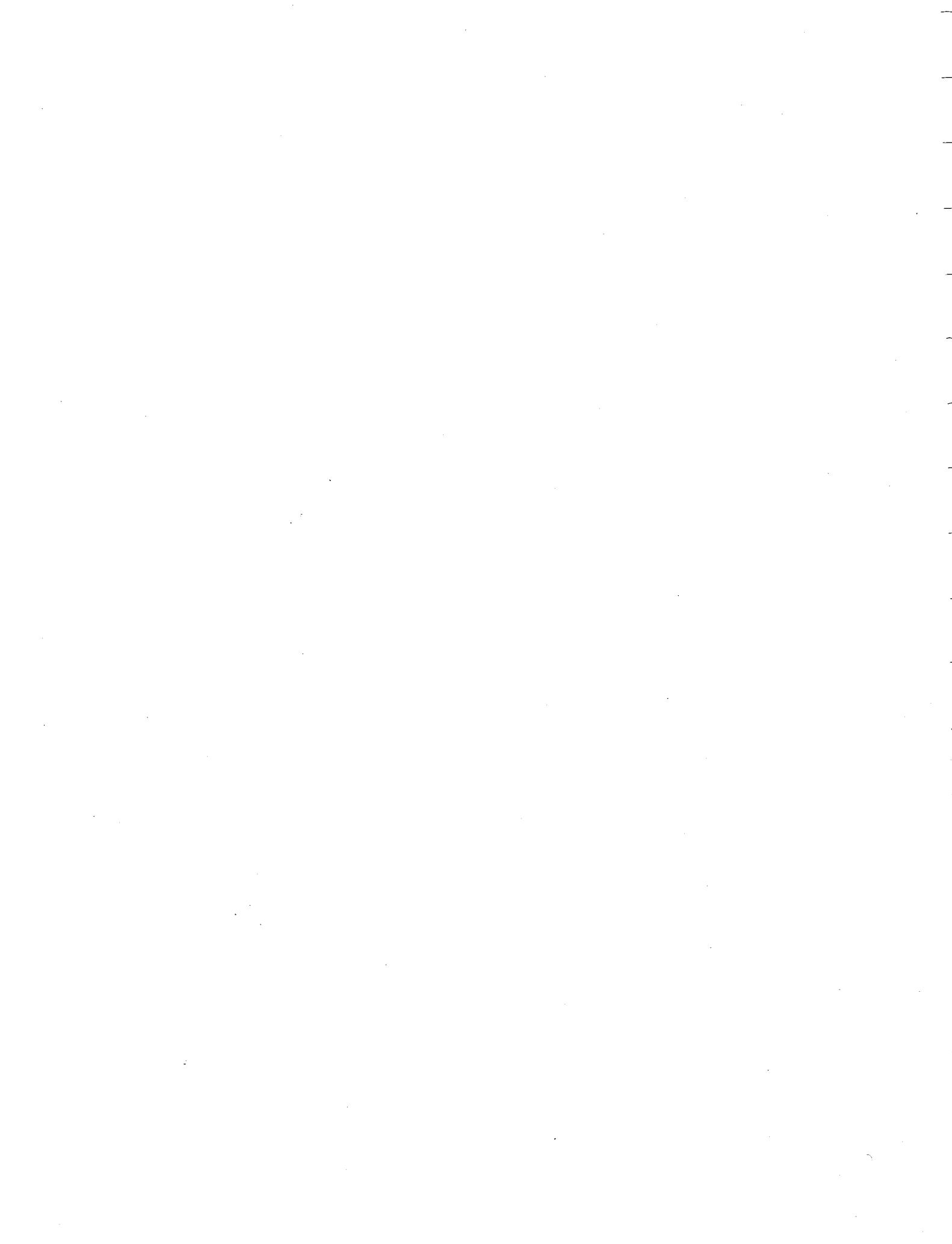
The Municipal Electric Association represents Ontario's 307 municipal electric utilities which deliver electricity as a local service, on a full-cost-recovery basis, with no recourse to taxes. These commissions operate on a not-for-profit, business basis, responding to the needs of 75% of residential and business customers in Ontario.

The MEA's role is simple. We exist to help our members provide quality, cost-effective service to their customers.

In keeping with this role, the MEA has taken a proactive approach to addressing restructuring in the electricity industry. As early as 1992, the MEA formed an "Ad Hoc Task Force to Review Institutional Options for Electricity in Ontario". Its aim was to become knowledgeable in the various institutional changes occurring worldwide in the electricity sector, with a view to identifying and recommending institutional options for Ontario. The work of the Task Force culminated in September 1994 with the production of the 2-volume report "Restructuring the Electricity Industry in Ontario", (the "Institutional Options" report). In 1995 the MEA membership adopted the report as the preferred framework for pursuing institutional reform of the electricity industry in Ontario.

Our submission has been the focus of an intense effort on the part of our members to elaborate on that framework, to address criticisms that have been made of it, and, in order to assist the Committee, to review and critique restructuring models put forward by other parties in the industry.

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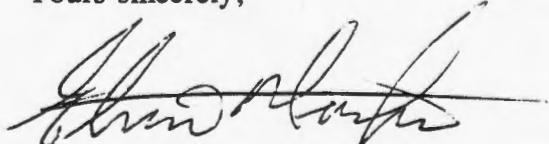
Our primary objective in developing a model for industry reform was to ensure that any restructuring would serve the needs of electricity customers in Ontario. Based on the experience of our member utilities, we know that customers want three basic things: equity, reliability and lowest price. We submit that the recommendations contained in the MEA submission, if implemented, will indeed produce the most reliable, equitable and lowest cost electricity service for all customers in Ontario.

The MEA submission contains several separate but related documents:

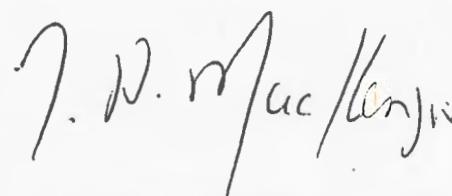
- an executive summary provides a synopsis of the discussion contained in the accompanying documents (see Tab: Executive Summary);
- the main report entitled "Generating Competition: Equity, Reliability and Lowest Price" (see Tab: Generating Competition);
- a companion report entitled "A Proactive Process for Restructuring Distribution in Ontario" (see Tab: Restructuring Distribution);
- a companion report entitled "Retail Access vs. The Pool Purchaser Model" (see Tab: Retail Access vs. The Pool);
- an appendix on "Developments in Other Jurisdictions" (see Tab: Other Jurisdictions);
- a response to the questions posed by your Committee in the Working Paper of December 12, 1995 (see Tab: Q & A).

We look forward to discussing this submission and our recommendations with you and your Committee on January 30.

Yours sincerely,



E. (Elvin) Martin
Chair



J.A. (Jim) MacKenzie
President



ACKNOWLEDGEMENTS

The MEA's submission to the Macdonald Advisory Committee on Competition in Ontario's Electric Industry is the product of extensive effort by many dedicated individuals. The MEA gratefully acknowledges the many members, Commissioners and utility staff who have contributed to the development of these reports and recommendations. Thanks are due in particular to members of the Institutional Options Task Force, listed below, who have dedicated a significant amount of time over the last three years in assisting the MEA to develop the industry's position on electricity reform.

In addition to our Ontario constituency, we would like to thank our many industry colleagues in other parts of Canada, the United States, England, Norway, New Zealand, Australia, Sweden and Denmark for their timely assistance with our research.

The MEA members express their deepest appreciation and gratitude for the knowledge, dedication and assistance of Dr. Adonis Yatchew, of the University of Toronto. We would also like to acknowledge Dr. Edward Kahn, of Lawrence Berkeley Laboratory, California, for his assistance.

Members of the Institutional Options Committee:

*K.D. (Keith) Matthews, Brampton (Chair)
K.J. (Kim) Allen, Scarborough #
J.A. (John) Alton, Lincoln #
D.C. (Carl) Anderson, North York
J.N. (John) Brooks, Toronto
R. (Bob) Coyle, Toronto*
R. A. (Bob) Davey, Collingwood
K.L. (Kent) Edwards, Windsor
G.D. (George) Hostick, Niagara Falls
C.F. (Carl) Kropp, Ottawa
E. (Elvin) Martin, Waterloo North
D.S. (Doug) McCaig, Fort Frances
J. A. (Jim) MacKenzie, Guelph
W.C. (Bill) Rowney, Milton
W.J. (Bill) Scott, York*

*H. (Homer) Vandervecht, Leamington
J. (John) Wiersma, Pickering
J.J. (Jim) Yarrow, Brampton
W.S. (Stan) Taylor, Special Advisor
M.M. (Milan) Nastich, Special Advisor
I.H. (Tony) Jennings, MEA
C.C. (Charlie) Macaluso, MEA
D.B. (Dane) MacCarthy, Ontario Hydro, Observer*
R. (Ron) Stewart, Ontario Hydro, Observer*
M. (Maurice) Tucci, MEA Secretary to Task Force*

* Past members of Task Force

New members from Joint Retail Study



PREFACE

On November 2, 1995 the Government of Ontario announced the establishment of an Advisory Committee on Competition in Ontario's Electricity System. Briefly, the Terms of Reference of the Committee were to:

1. Examine the economic, technological and public policy trends facing Ontario Hydro and the provincial electricity system and assess existing barriers to change.
2. Make recommendations on the structural, legislative, regulatory and, potentially, ownership reforms required to ensure Ontario Hydro and the provincial electricity system are poised to meet the competitive challenges of the 21st century.
3. Investigate and assess options for phasing in competition in Ontario's electricity system.

The Committee's mandate was to complete its work and report back to the government by April 30, 1996. The Committee released its first Public Notice and Working Paper on December 12, 1995, setting a deadline for written submissions of January 26, 1996.

The MEA, through its 307 member utilities, represents over three-quarters of Ontario's electricity consumers. Within the limited time available, we have outlined a plan for restructuring the electricity system in a way that provides the most benefit to Ontario customers, a plan for generating competition, while maintaining equity, reliability and the lowest price.

We urge the Advisory Committee to adopt and forward our recommendations to the Government of Ontario.

"...Hydro is not owned by the Government. Hydro emanated from, and is still basically an emanation of, a partnership of municipalities. To put it in understandable terms, municipalities are the shareholders in the system."

Premier Frost
February 24, 1959



A READER'S GUIDE
TO THE SUBMISSION OF THE MUNICIPAL ELECTRIC ASSOCIATION
TO THE ADVISORY COMMITTEE ON COMPETITION
IN ONTARIO'S ELECTRICITY SYSTEM

GENERATING COMPETITION: EQUITY, RELIABILITY AND LOWEST PRICE

The submission is divided into sections which are identified by tabs. Below is a brief description of what is included in each section.

Executive Summary

This document provides a summary of recommendations to the Advisory Committee.

Generating Competition

Behind this tab is found the MEA's main submission to the Advisory Committee: "Generating Competition: Equity, Reliability and Lowest Price". This paper closely follows the Advisory Committee's Terms of Reference. It describes pressures for, and barriers to, change. It examines the criteria and principles that should guide the Committee, and critiques other models for restructuring. It describes the MEA's proposed model for structure, ownership and regulation of the electricity supply industry and assesses its impacts. An implementation plan is included.

Restructuring Distribution

This companion paper to the main submission, entitled "A Proactive Process for Restructuring Distribution in Ontario", examines the characteristics of the distribution sector and the principles that should guide its restructuring. It proposes a proactive process for change which ensures maximum benefits to customers.

Retail Access vs The Pool

This companion paper, entitled "Retail Access vs The Pool Purchaser Model", examines two generic approaches to electric industry restructuring: the retail access model and the pool purchaser model, as well as Ontario Hydro's variant of the retail access model: the convergence model.

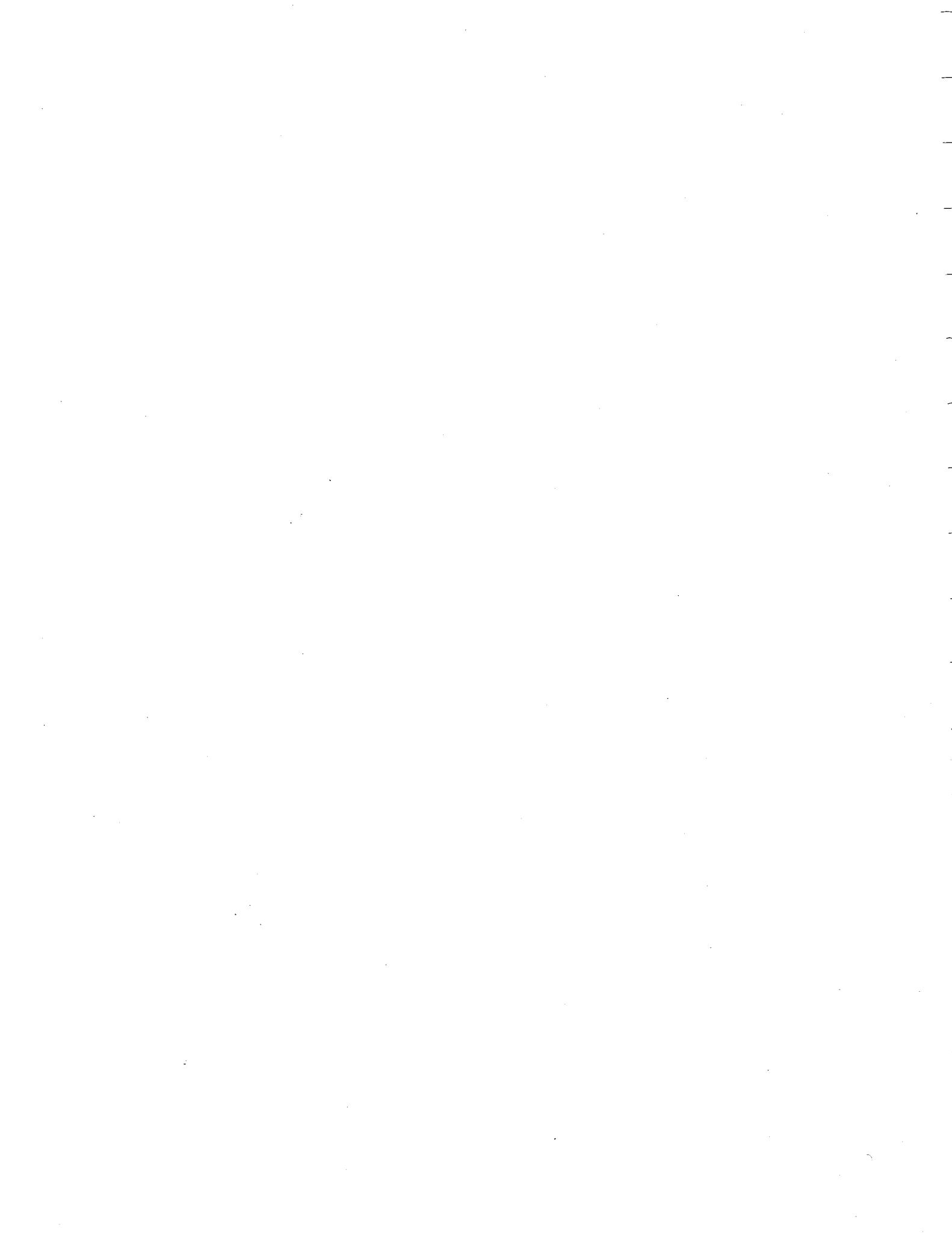
Other Jurisdictions

Our appendix entitled "Developments in Other Jurisdictions" provides the reader with an overview of restructuring efforts in some of the other provinces, United States, England and Wales, Norway, New Zealand and Australia.

Q & A

In December 1995 the Advisory Committee issued a Working Paper which posed a multitude of questions regarding restructuring. This appendix answers those questions directly.



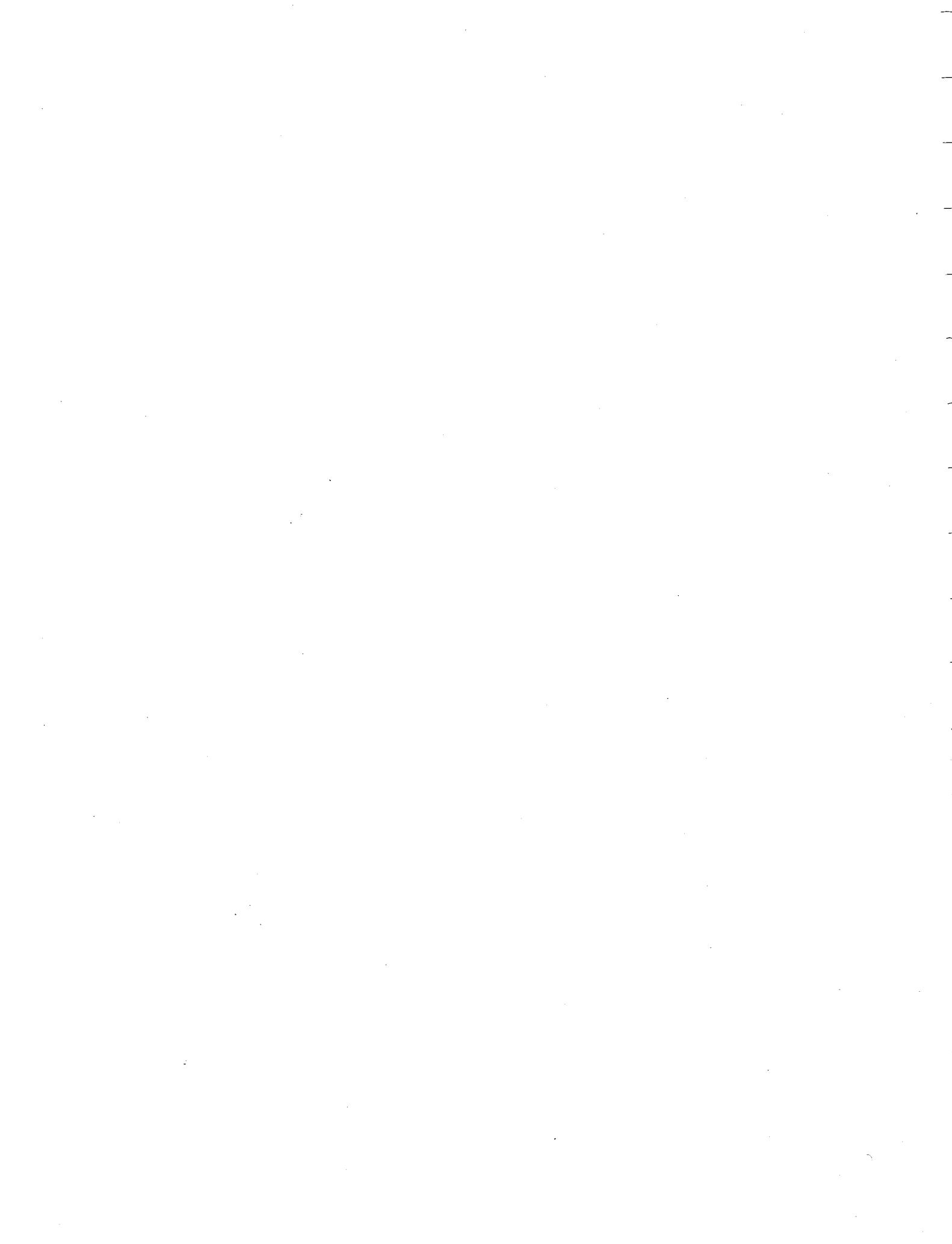


Municipal Electric Association

EXECUTIVE SUMMARY

Submission to the

**ADVISORY COMMITTEE ON COMPETITION
IN
ONTARIO'S ELECTRICITY SYSTEM**



EXECUTIVE SUMMARY OF RECOMMENDATIONS

INTRODUCTION

The following recommendations summarize the Municipal Electric Association's submission to the Advisory Committee on Competition.

The principal objective of restructuring the electricity industry is to move to competition in generation and to properly position distributing utilities to deal with forthcoming changes in the industry. The current excess capacity permits Ontario the opportunity to bring about change in a timely and prudent fashion. Such changes should build on Ontario's unique strengths. In addition, the urgency is not as intense as it is in jurisdictions (such as California) where rates are much higher than those in Ontario. The Advisory Committee on Competition and the government should fully take into account the views of all stakeholders and the impacts on them before making sweeping changes to the electricity system in Ontario. (No U.S. state has introduced major changes without careful and considerable consultation.) Finally, it should be recognized that a multiplicity of details must be resolved prior to final implementation of any restructuring plan.

STRUCTURE

1. The electricity industry should be vertically unbundled.

Generation, transmission and distribution should reside in separate entities with independent governance structures. Transmission and distribution functions currently performed by Ontario Hydro should be transferred to separate entities.

2. A competitive wholesale electricity market should be established.

All private and public generators should have the opportunity to supply the wholesale market for power on a non-discriminatory basis. Electricity would be purchased by the pool on a competitive basis from least cost suppliers.

3. There should be a horizontal de-integration of existing generation.

In order to facilitate competition, generation currently owned by Ontario Hydro should be separated into multiple nuclear, fossil and hydraulic generating companies.

4. The obligation to serve and supply should be transferred from Ontario Hydro to the distributors.

Devolving the obligation to serve *and supply* to distributors will reduce the degree of central planning, level the playing field amongst generators, and prevent cross-subsidization and self-dealing which could occur in a vertically integrated structure.

5. The power pool concept shall be retained.

The presence of a wholesale electricity pool will provide equitable access to reasonably priced electricity to all distributors and hence to all end-use customers. It will also act as a vehicle for pooling risks associated with

uncertainties in the price and availability of electricity.

6. The power pool should be operated by the transmission company.

The transmission company should operate the wholesale market for electricity. Under this arrangement, each distributor will forecast requirements and arrange contracts of varying duration with the pool operator. The pool operator will then aggregate the demands and arrange matching supply contracts through a competitive bidding process. The pool operator will also operate a spot market for electricity in order to satisfy any un-contracted demands. It is expected that distributors will seek to satisfy most of their needs through long-term contracts.

7. Retail access should be rejected.

While there was initially considerable interest in retail access, many jurisdictions have either rejected it, retreated from it, or are implementing a version which does not achieve the original objectives. The two issues that dominate virtually all discussions of restructuring are vertical separation of integrated monopolies, with the objective of reducing their monopoly power, and the recovery of costs associated with stranded assets. Retail access remains a theoretical concept with many unresolved technical issues, (such as transmission system operation and metering). To the extent that retail access has been implemented, it has not resulted in any benefits to residential, commercial and small business customers.

Implementation of retail access in Ontario would be inappropriate for the following reasons:

7.1 *Stranded Assets:*

Ontario Hydro has very substantial debt obligations associated particularly with its nuclear facilities. Under retail access, there is serious risk that uneconomic bypass, especially by large industrial customers or by municipal utilities, would occur, seriously threatening the financial viability of existing assets.

7.2 *Irreversibility:*

Once retail access is permitted, it must be available on a non-discriminatory basis to all suppliers, including those in the U.S. The large number of private contracts that would be put in place (in some cases, with international parties), would be very difficult to reverse.

7.3 *No Reciprocal Right of Access to U.S. Markets:*

Reciprocity is not a requirement of the North American Free Trade Agreement (NAFTA). In particular, open access to the Ontario electricity market does not imply a reciprocal right of access by Ontario producers to U.S. markets. Thus, Ontario could suffer significant stranded assets as excess U.S. capacity is unloaded in Ontario.

7.4 *Equity Considerations:*

Availability of retail access to large industrial customers without equal opportunities for residential and other small customers, would result in an unfair transfer of costs to the latter. Permitting some customers to leave without 'making

the system whole', penalizes those that are captive.

7.5 *Loss of Economic Dispatch:*

Currently the transmission system operator (Ontario Hydro) determines the output of different generators in order to minimize overall system costs. Implementation of retail access could lead to the loss of such benefits.

7.6 *Obligation to Supply Would Disappear:*

Under retail access, market forces would need to be relied upon to ensure that adequate supply is available. This may be politically unacceptable as many customers would fear that supply could be inadequate.

7.7 *Costs of Retail Access:*

Generation supply accounts for the dominant portion of electricity costs -- about 70% in Ontario. Retail *supply* typically accounts for less than 3%. (Remaining costs are for transmission and distribution.) Vigorous competition at the wholesale level will exhaust most competitive benefits. Any benefits of extending competition to the retail level are questionable and are limited by the relatively small proportion of final price that corresponds to the retail supply business. Furthermore, they would likely be outweighed by the additional transactions costs that end-use customers incur in procuring their needs through marketers and brokers. Metering costs and other technical problems make implementation of retail access for all customers impractical.

8. Distributors should assist customers in obtaining energy services. Delivery of energy services should not be limited to distributing utilities.

It is difficult to predict the nature of energy services that will emerge, the technologies that will become the industry standard, the degree of scope and scale efficiencies for those that deliver such services and the kinds of investments that may be required. Nevertheless, distributors have direct contact with end-use customers, and are most familiar with their needs. As such, they should be responsible for assisting customers in obtaining the energy services they need. It would be preferable if energy services were provided by a multiplicity of competing companies, private and public.

9. The distribution of electricity should be separated from transmission and generation.

Distribution currently performed by Ontario Hydro should be assumed by local distributing utilities. Responsibility in remote and unorganized territories should devolve to separate, unrelated, independent, customer-governed utility commissions that will operate under the same conditions that apply to all utility commissions.

10. The electricity distribution system should be restructured once it is separated from generation and transmission.

Once distribution is separated from transmission and generation, the distribution system should undergo restructuring to form a system of shoulder-to-shoulder, i.e., contiguous utilities.

Principal drivers of the restructuring process should be:

- 10.1 the requirement for distributors to fulfil the new responsibilities, in particular, the obligation to serve and supply and evolving responsibilities in the area of energy services;
- 10.2 forecasting and contract negotiation responsibilities that will be undertaken by distributors;
- 10.3 the requirement that all municipal distributors expand to their municipal boundaries;
- 10.4 scale economies, i.e. the potential for cost savings through amalgamation/cooperation with neighbouring utilities;
- 10.5 scope economies, i.e. the potential for cost savings through consolidation of electricity distribution with water, sewage and other infrastructure services;
- 10.6 the preferences, desires and values of local customers and communities;
- 10.7 accountability to the customer and the local community;
- 10.8 reliability and customer service.

Uniform utility structures (e.g., size, type and levels of service) throughout the province are neither necessary nor desirable. Distribution systems vary throughout the world, and systems that incorporate municipal utilities are common. (Germany has over 800 and is considering adding another 150. Norway has over 200 distributors, many of which are municipals, and

New Zealand has 47.) Nevertheless, distributing utilities in Ontario should be no smaller than a municipality and no larger than a region, county or district.

11. There should be an arm's-length relationship between distributors and municipal governments.

Distribution utilities shall continue to operate as stand-alone cost centres. No tax dollars should be used to fund operations and, conversely, distributor revenues should be used exclusively to provide services to customers. Within this broad costing and pricing framework, commissions should have the flexibility to design rates to meet local needs. Multi-service utilities must account for each service separately.

12. Direct customers should purchase power from distributors.

Direct customers currently served by Ontario Hydro should be served by the distribution entities that are created from Ontario Hydro or by a local distributing utility capable of serving their needs.

13. Distribution should be decentralized.

All distribution within the province should be the responsibility of local distributors. No provincial entity should be responsible for distribution. Such arrangements are consistent with other decentralization initiatives undertaken by the provincial government.

14. Large-scale amalgamation of distribution is inappropriate.

Proposals to create a small number of regional monopolies should be rejected. Such arrangements eliminate local accountability; they increase monopoly power of distributors with no demonstrable compensating benefit; they impair the ability of the regulatory authority to use yard-stick regulation / competition; and, they would be difficult to reverse. The majority of end-use customers in Ontario are already served by distributors whose size is well beyond that necessary to achieve scale efficiency.

15. A merger of distributors with Ontario Hydro should be rejected as it is anti-competitive.

Proposals by the Financial Restructuring Group and Ontario Hydro management that municipal distributors be merged into Ontario Hydro are contrary to the public interest and should be rejected. Such a merger would be fundamentally anti-competitive, would strengthen the monopoly power of Ontario Hydro and would require regulatory contortions to protect the consumer. Nor will merger solve Ontario Hydro's financial problems. The independence of the municipal electric utilities and the threat that they might seek supplies elsewhere strengthens the incentives for Ontario Hydro to improve efficiency and to put its financial house in order. The objective should be to maintain pressure on the generation side of the business through the municipal electric utilities and their customers.

16. Ontario Hydro adaptation of convergence models increases monopoly power for

Ontario Hydro and exposes customers to unnecessary costs and risks. As such, the Ontario Hydro proposal should be rejected.

Ontario Hydro convergence scenarios do not propose full and complete separation of transmission and distribution from generation. Thus, monopoly power remains within Ontario Hydro.

Furthermore, convergence theories, to the extent that they are specified by Ontario Hydro, rest on a number of unproven and untested assumptions. While the various technologies within the information industry are converging, (in the sense that major players are entering each other's markets), a recent major study by the U.S. Electric Power Research Industry concluded that electricity industries do not have any competitive advantage in any such industries. The one market niche available to the electric utilities is energy services. However, if developments in this area are truly to be customer driven, they should be pursued in the context of independent companies with the possible involvement of distributors.

Furthermore, in the context of the convergence model, Ontario Hydro has indicated a number of legislative changes that should be implemented as quickly as possible. These include increased discretion with respect to repayment of debt, increased flexibility to invest in telecom, the right to cross-subsidize and the freedom of action enjoyed by private business corporations in Ontario. No such legislative changes should be introduced until Hydro has been vertically unbundled and until it faces the discipline of the market. Expansion of monopoly power will only hinder future restructuring efforts and risks Hydro investments in businesses for which the rate-

payer or tax-payer will ultimately be responsible.

OWNERSHIP

17. When considering ownership options, customer benefits should be the over-riding objective.

No portion of Hydro assets should be privatized unless it can be clearly demonstrated that such an action will reduce the cost of electricity in the short run and in the long run. No form of full or partial privatization should be considered until a separate transmission company and separate generating companies are created. In this connection, it should be noted that financial simulations performed by Ontario Hydro management indicate that privatization will increase rates to customers by as much as 30%. Simulations performed by Ontario Hydro's Financial Restructuring Group also indicate that rates will increase as a result of privatization.

18. The transmission company, which is a natural monopoly, should be publicly owned.

There are no apparent benefits from private ownership of the transmission system. Private ownership would increase rates through higher costs associated with capital and taxes. More vigilant regulation would be required to protect against monopoly profits and to ensure fair access to the transmission system. On the other hand, public ownership protects against re-integration of competitive portions of the industry with monopolistic ones, as is occurring

in the U.K. where distribution, transmission and generation are in the private sector.

19. Distribution companies should be locally owned and controlled.

The distribution system should be operated by locally owned, shoulder-to-shoulder (i.e., contiguous) utilities. First, local ownership ensures responsiveness to local needs. Second, distribution is a natural monopoly. There is no evidence to suggest that private, regulated, natural monopolies charge lower rates than public-sector monopolies. Indeed, the most recent statistical analysis concludes that, even after adjusting for a variety of factors, (including scale of operation, factor costs, access to hydroelectric sites, taxes and capital cost discrepancies), publicly owned electric utilities in the U.S. have lower rates than private utilities. Third, as with public ownership of transmission, public ownership of distribution protects against re-integration of competitive portions of the industry with monopolistic ones.

20. Privatized generation companies should be smaller rather than larger.

In order to avoid anti-competitive behaviour, (e.g., of the kind observed in the U.K.), smaller competing generation entities rather than larger ones should be created.

21. The Financial Restructuring Group privatization proposal should be rejected.

The Financial Restructuring Group privatization proposal, which would first create a powerful centralized monopoly and would lead to much

higher electricity rates than the MEA proposal (despite the proposed expropriation of municipal utility equity) should be unequivocally rejected. The reduction of public debt is tiny in comparison to the inherent value of assets that would be privatized.

22. Privatization of Ontario Hydro requires consent from the present owners.

Any sale, privatization or other disposition of Ontario Hydro assets shall recognize and require the consent of its owners, including the municipal electric utilities.

REGULATION AND ENVIRONMENTAL ISSUES**23. Safety of nuclear operations must be assured.**

The presence of competitive pressures must not be permitted to compromise nuclear safety in any way. The regulatory process controlling safety should maintain complete autonomy.

24. A provincial 'electricity regulator' that is at arm's-length from the government and has the power to enforce decisions should be established.

The regulator should be charged with:

24.1 ensuring a smooth transition to greater competition in generation without the creation of stranded assets;

24.2 regulation of wholesale costs and rates during the transition period;

24.3 ongoing regulation of transmission company costs and capital plans.

In order to minimize regulatory costs and to take advantage of informational efficiencies, it would also be desirable for the regulator to be responsible for environmental matters.

25. Regulatory control over distributors should reside with local commissions.

Local regulatory control will ensure accountability to the end-use customer. Yardstick cost and performance measures should be further developed for distributing utilities to assist local commissions in their regulatory role. A mechanism would need to be developed to ensure uniformity of accounting methods and transparency of costs. Distributors should retain an arm's-length relationship with the local government.

26. Environmental issues should not be approached on a piece-meal basis and all energy producing and using sectors should be treated in a consistent manner.

The electricity regulator's actions on environmental issues should be in close coordination with actions of regulators of natural gas and other energy sectors.

27. There should be a clear separation of government activities that redistribute income from production or business activities.

Clear rules should be established for the provision of subsidies or other means of sustaining uneconomic services, (such as rural

rate assistance or demand side management programs that are not self-financing). Financing mechanisms should also be clearly specified.

IMPLEMENTATION

- 28. In order to provide Ontarians with the best electricity future, vertical unbundling and the appointment of a regulator to oversee the restructuring should take place as soon as possible. There should be a transition period, to the year 2000, during which time Ontario Hydro, and its descendants, prepare for competition and the distribution segment of the industry restructures to meet its new responsibilities.**

While the timing of the proposed schedule is brisk, an attractive feature of the plan is its ease of implementation (particularly in comparison to retail access approaches).

January 1, 1997:

- 28.1 separate publicly owned transmission and generation companies come into being;
- 28.2 separate distribution companies servicing Ontario Hydro's current retail and direct customers come into being and the process of requiring municipal utilities to assume responsibility for all distribution in their respective areas begins;
- 28.3 a provincial regulator begins serving an initial three-year term to oversee the transition period.

Transition Period: January 1, 1997 -- January 1, 2000:

- 28.4 separation of generation into multiple nuclear, fossil and generation companies is considered and implemented if appropriate;
- 28.5 the generating segment of the industry reduces its debt in preparation for full competition;
- 28.6 the obligation to procure adequate generation to meet provincial needs transfers to the transmission company; during the transition period, demands must first be satisfied using Ontario Hydro generation or NUG contracts currently in effect;
- 28.7 the distribution segment of the industry begins restructuring necessary to meet its forthcoming obligations;
- 28.8 local distribution studies are undertaken to ensure that any cost-effective change that will benefit customers occurs in a timely and proactive fashion;
- 28.9 the final decision on restructuring of distribution is made at the local level, with such legislative support from the province as is necessary;
- 28.10 possibilities for privatization of portions of generation, OHII and OHT are considered.

January 1, 2000:

- 28.11 the obligation to procure adequate supply for customers rests solely with the distribution companies;
- 28.12 contracts for supply between distributors and the transmission company and the transmission company and generators commence;
- 28.13 full competition in generation supply commences; the transmission company is free to purchase from the least-cost generators.

IMPACTS**29. The MEA proposal for restructuring should be adopted.**

Implementation of the MEA model provides the following positive benefits:

29.1 RELIABILITY, QUALITY AND SECURITY OF SUPPLY:

Under the model proposed by the MEA, these will be assured, since distributors, who are directly accountable to local commissions, will have the obligation to serve and to secure adequate supply, and will be most directly accountable for reliability.

29.2 EQUITY:

The MEA proposal protects against unfair rate impacts due to cross-subsidization which could occur under retail access scenarios.

29.3 MINIMUM RISK OF STRANDED ASSETS AND COSTS:

The MEA proposal minimizes the risk of stranded assets through controlled entry until excess capacity is absorbed. Models involving retail access expose Ontario to dumping of excess U.S. capacity within Ontario and to various forms of uneconomic bypass.

29.4 EFFICIENCY GAINS IN DISTRIBUTION:

The MEA proposal for restructuring the distribution segment of the industry, combined with yardstick regulation / competition, maximizes the potential for efficiency gains through cost-effective increases in the scale of operations, where appropriate, expansion in scope of services and productivity improvements. These savings would be lost if a single monolithic distribution utility were created.

29.5 LOWEST PRICE:

Under the MEA proposal, there is continuous downward pressure on rates as a result of the creation of multiple generation companies from Ontario Hydro, the introduction of competition in the wholesale market for generation and yardstick competition in distribution. These factors ensure that rates are lower than any of the other proposals without the risk of stranded assets. Privatization is implemented only if it leads to lower rates.

29.6 EASE AND SPEED OF IMPLEMENTATION

The model proposed by the MEA is simple to implement, particularly when compared to the alternatives. Vertical unbundling can be implemented immediately -- generation, transmission and distribution

functions already reside in separate business units within Ontario Hydro. Restructuring of the distribution sector and horizontal de-integration of generation can proceed contemporaneously. The presence of an authoritative regulator will ensure that the process is expedient and unobstructed.

- 29.7 **ECONOMIC COMPETITIVENESS:**
The MEA model enhances economic competitiveness through maximum rate reductions while maintaining rate stability.

Vertical unbundling and the creation of multiple generators in a domestic competitive setting maximizes the potential that these companies will be able to insert themselves successfully into U.S. markets. Competition in generation will also assure low domestic prices, which is the best protection against foreign competition, while preserving the interests of the consumer. The presence of cost pooling in the MEA model protects against large regional rate disparities.



GENERATING
COMPETITION



Municipal Electric Association

**GENERATING COMPETITION:
EQUITY, RELIABILITY AND LOWEST PRICE**

Submission to the

**ADVISORY COMMITTEE ON COMPETITION
IN
ONTARIO'S ELECTRICITY SYSTEM**





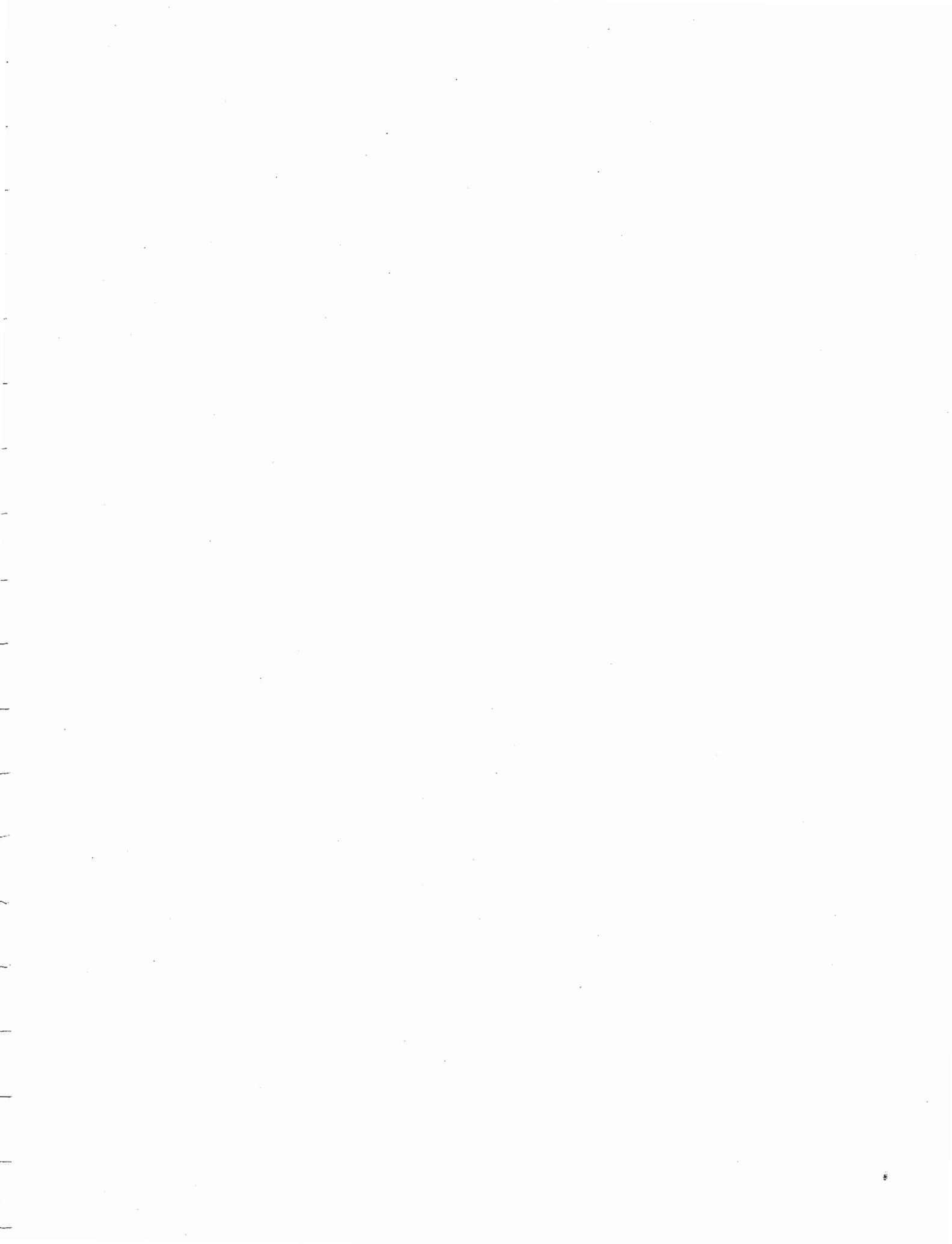
GENERATING COMPETITION: EQUITY, RELIABILITY AND LOWEST PRICE

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I. INTRODUCTION

MEA Consensus Building Process

In 1992 the MEA formed the "Ad Hoc Task Force to Review Institutional Options for Electricity in Ontario" (Ad Hoc Task Force). Its objective was to gain a thorough understanding of the various institutional changes that had begun taking place in electricity markets world-wide, and to identify and recommend options for Ontario.

The work of the Ad Hoc Task Force was divided into three phases. Phase I identified options (Phase I Report - May 1993). Phase II assessed impacts of alternative options and developed recommendations (Phase II Report - August 1993). Phase III developed and recommended a strategy to implement the most appropriate option for Ontario (Final Phase III Reports - September 1994).

Consultations with MEA membership began in 1992 and continued through numerous District Meetings, two Summer Conferences, and three Annual Meetings.

At the 1995 MEA Annual Meeting, the MEA membership formally adopted the Final Phase III September 1994 Report, *Restructuring the Electricity Industry in Ontario, Volume I: Recommended Strategy*, as the framework for pursuing institutional reform of the electricity industry in Ontario.

The MEA sought and received feedback on its reports from industry stakeholders including Ontario Hydro and AMPCO. Furthermore, the MEA regularly apprised the Ministry of Environment and Energy of its work.

The Ad Hoc Task Force has benefited from the input of many Canadian and international experts. It has also been in contact with regulatory agencies in other

Canadian provinces, in numerous states of the U.S., with the Office of Electricity Regulation (OFFER) of the United Kingdom, and with authorities in Norway, Sweden, New Zealand and Australia.

Overview

This document summarizes the arguments the MEA sees as central to the debate on restructuring, it synthesizes them in the Ontario context, paying particular attention to Ontario's strengths and weaknesses, and proposes a specific restructuring and implementation plan. The document also discusses other proposals which have emerged and the reasons that they do not serve the public interest. Some proposals share substantial common ground with those contained here. Others, such as the one which would create a single monopolistic, vertically integrated utility, violate the most basic principles of public policy and regulatory theory.

The current paper is accompanied by two companion documents. The first, entitled *Retail Access vs the Pool Purchaser Model*, discusses in greater detail the arguments which distinguish retail competition from wholesale competition. The paper concludes that competition at the wholesale level (with power acquired through a competitive bidding process by the transmission company), not only brings the benefits of competition but also protects Ontario ratepayers and taxpayers from a number of unnecessary risks and losses.

The second companion document, entitled *A Proactive Process for Restructuring Distribution in Ontario*, sets out an approach which maximizes distributor accountability and responsiveness, as well

as ensuring that maximum efficiencies in distribution are realized.¹

To keep the analysis in perspective, it is important to keep in mind that the generation segment of the electricity industry accounts for about 70% of costs.

¹ In addition, a document entitled *Responses to Committee Working Paper*, contains specific replies to each of the questions posed by the Committee. There is also a document, *Developments in Other Jurisdictions* which briefly summarizes restructuring initiatives elsewhere.

It is here that competition can be introduced and where the greatest efficiency gains lie. The transmission and distribution segments each have about a 15% share of total costs (see Figures 1 & 2, where the corresponding breakdown for the system in the United Kingdom is also illustrated). The natural monopoly characteristics of these segments preclude direct competition, but we will argue efficiency gains can be made in other ways.

Figure 1: Electricity Cost Breakdown

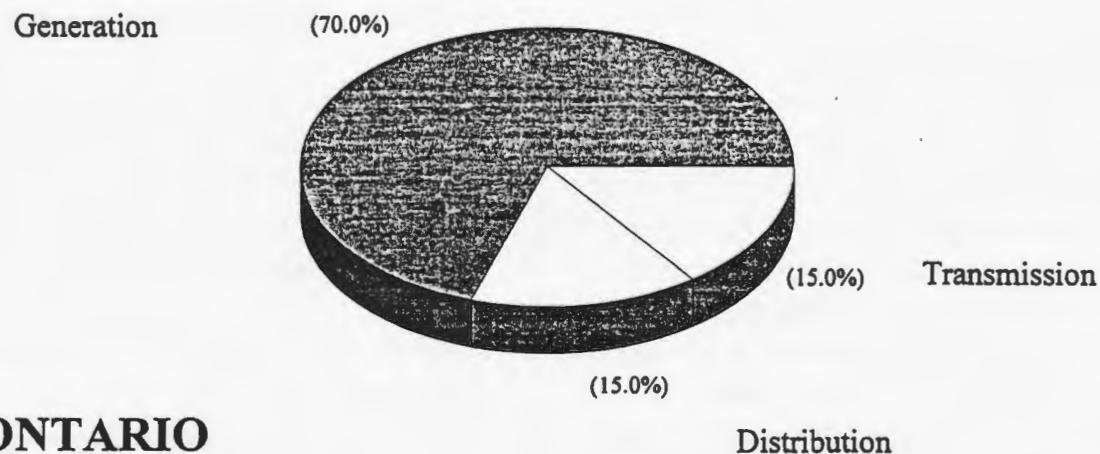
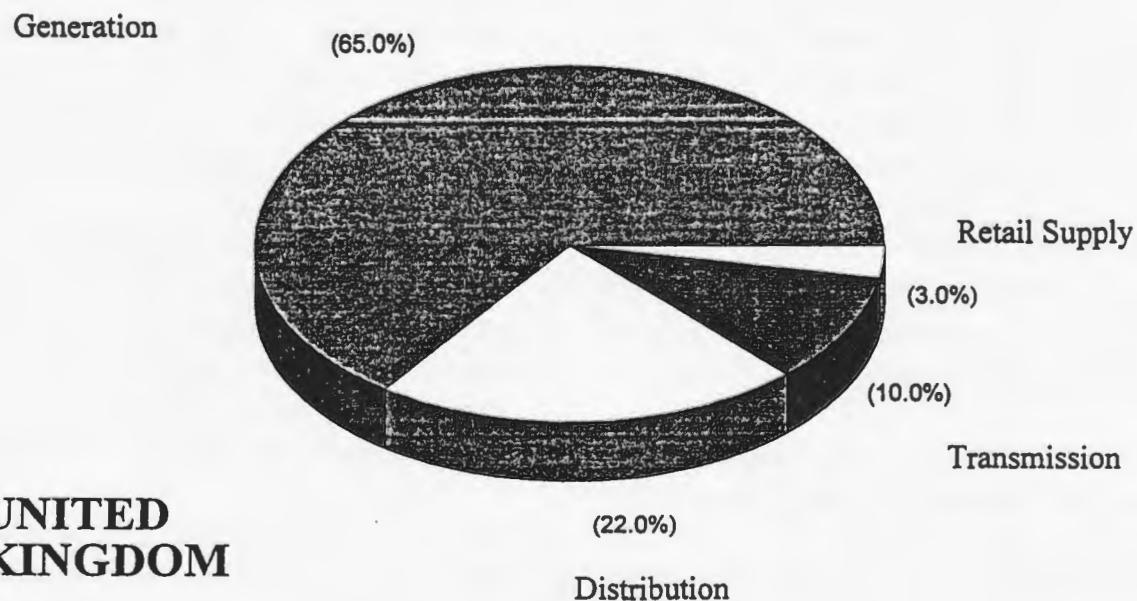


Figure 2: Electricity Cost Breakdown



II. BACKGROUND

Ontario Hydro was created in 1906 as a result of a consumerist movement of municipalities. At that time, Ontario was moving from an agrarian economy to a manufacturing economy, thus requiring significant increases in energy supplies. Hydraulic generating facilities at Niagara Falls were producing relatively cheap power, but two of the generating companies were private U.S. companies. A transmission corridor between Niagara Falls and Toronto was constructed to supply hydro-electric power to Toronto, but other communities in southern Ontario also wanted to share in the benefits of this natural resource. The civic movement at the start of the century became a major factor in the establishment of municipal utilities, and it provided the final impetus for the creation of Ontario Hydro as a transmission cooperative working on behalf of municipalities. Ontario Hydro's mandate was to ensure that electricity would be available across the province.

The Hydro-Electric Power Commission of Ontario built its first hydraulic generating station in 1914. The 433 MW facility, constructed at Niagara Falls in 1919, represented the largest hydraulic facility in the world. Hydraulic generation continued to be the source of new supply until the 1950s. Electricity prices fell for the first half of the century, partly as a result of conservative accounting policy, since hydraulic assets were depreciated over a much shorter period than their actual useful lifetime.

By the 1950s, because large-scale hydraulic generation sites had been exhausted, Ontario Hydro began to build coal fired stations. In the 1970s Ontario Hydro embarked on a nuclear program due, in part, to a governmental industrial and economic strategy which sought to develop an advanced technology, both for domestic use and for export

purposes. The arguments in favour of the nuclear technology included low forecast generation costs, security of fuel supply and the lack of emissions. However, nuclear generation ultimately proved to be much more expensive than originally estimated.

In the mid 1970s major nuclear capacity additions caused huge rate increases, and resulted in the only major modification to the institutional structure -- the Ontario Energy Board was granted review, but not regulatory powers, over Ontario Hydro.

In the late 1980s, the price of electricity increased substantially, again due primarily to capacity additions. These increases occurred just as the economy experienced a decline.

During the early 1990s, Ontario Hydro has experienced virtual stagnation of load growth, and there is greater uncertainty surrounding forecasts of future load. Ontario Hydro currently has considerable excess capacity. Its ability to further reduce rates is limited by its enormous debt burden. The rate increases, and the decline in natural gas prices, have created strong incentives for industry and distributing utilities to self generate.

In the face of potential mass defections, Ontario Hydro has implemented significant cost control measures, including a 25% reduction in staff levels, massive reductions in capital programs and write-offs of unprecedented proportions. It has also undergone internal restructuring into business units.

Ontario Hydro has not increased its average rates for the past few years and has committed to holding the line on rate increases for the next few years.

A. PRESSURES FOR CHANGE

Economic Trends

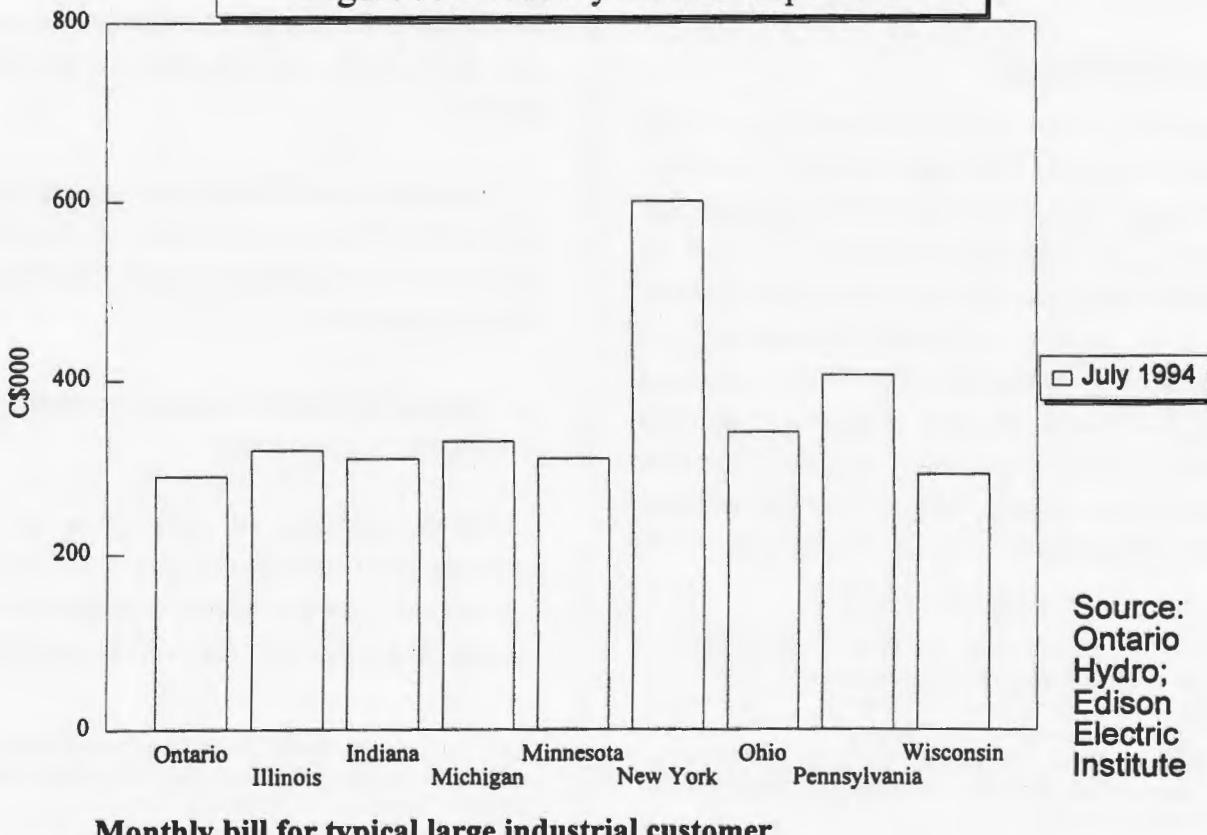
The globalization of the economy has led many industrial and commercial customers to seek ways to reduce their operating costs, including electricity costs. Customers want rates which are competitive with rates available to customers in competing markets.

Residential and commercial electricity rates in nearby U.S. states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania) are higher, and in some cases much higher, than in Ontario. Industrial rates are more comparable, though Ontario has among the lowest rates even in this category (see Figure 3). Nevertheless, the wide-spread surplus of electricity capacity in the U.S. has caused many utilities to introduce special

rates to attract or retain customers. Such rates may, at times, be lower than Ontario Hydro's standard industrial rates.

For 1996, Ontario Hydro has implemented a Load Retention and Expansion Rate option which allows the utility to respond with a negotiated price when it faces competition from lower cost energy suppliers. These rates carry two important risks. First, under certain circumstances, they may constitute predatory pricing and may involve cross-subsidization. Second, by appeasing large industrial users, these rates remove one of the most potent sources of pressure for fundamental change in this Province.

Figure 3: Electricity Costs Comparison



Thus far, it is critical to note, nothing has been done to *institutionalize* competition in electricity. Ontario Hydro continues to be a powerful, vertically integrated monopoly. Furthermore, what Ontario Hydro often refers to as 'competitive pricing' is actually anti-competitive. If the response to competitive pressure is simply to eradicate it by exercising market power, then there are no long term benefits to the consumers of electricity.

Continuous pressure on Ontario Hydro is essential to regain the competitive advantage Ontario once had with electricity costs.

Another important economic factor to consider, both in Ontario and elsewhere, is that uncertainty bands surrounding current forecasts of load are much broader than forecasts made in the 1970s or for that matter as recently as 1989.² Consequently, there is a considerable advantage to short lead time technologies with lower capital costs.

Technological Trends

Historically, the institutional structure of the electricity industry has been primarily driven by technology. From 1900 to 1970, technological advances and increasing returns to scale in generation resulted in a systematic decline in the price of electricity. As a result, generators enjoyed a favourable relationship with their regulators throughout North America; regulators approved projects which consistently brought down the average price of electricity. The technological realities meant that ever increasing plant size

² See "Light Years Away", by Daniel Stoffman, *Globe and Mail*, Report on Business Magazine, October 1993, 77-89. Ontario Hydro Demand/Supply Plan Report, 1989, p.3-14, and Environmental Assessment Board Hearing into Ontario Hydro's Demand Supply Plan, Exhibit 796, "Demand Supply Planning - Developments Since Panel 10", Attachment C, Load Forecast - December 1992, p. 129.

favoured a monopolist in generation. Requirements for coordination with transmission and distribution resulted in vertical integration in most jurisdictions.

During the 1970s, efficiency gains from increasing plant size levelled off. Since there was no longer a compelling economic rationale for a single supplier, multiple generators of electricity could co-exist and indeed compete against each other within a single market.³ During the 1980s and 1990s, the decline in natural gas prices and advances in combined cycle generation reduced the minimum efficient scale in generation to the point where self-generation, non-utility generation, and co-generation have become both feasible and attractive. Minimum efficient scale is now as low as 50 MW (see Figure 4). Smaller scale also reduces lead time and capital risk.

A second major recent technological trend is the innovation in information technology. The precipitous drops in the price of information processing and transmission and the intense competition in the telecom and information industries have several important implications for the electricity industry:

- coordination problems related to transmission of electricity from multiple suppliers have largely been resolved, facilitating vertical unbundling of the electricity industry;
- product innovation in energy services is likely to accelerate in the future;
- various theories of convergence are being advanced; some posit convergence of energy sources (for example, gas distributors providing electricity services and electricity distributors providing gas

³ For more information on declining economies of scale in generation, see MEA "Restructuring the Electricity Industry in Ontario": Volume II 3-4, September 1994.

services); others posit convergence of telecommunication services with electricity distribution services (for example, fibre optic systems owned by electricity distributors providing phone, cable and energy services);

- the 'wires' have become the important strategic asset because they allow access to the customer; as such, they have also become the target for take-over.

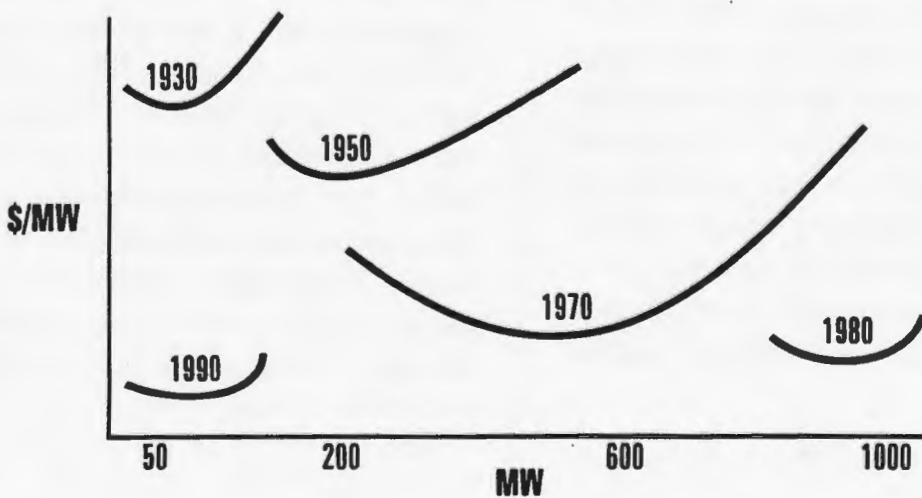
Public Policy Trends

Vertical unbundling or de-integration has occurred in a number of electricity industries around the world. It has also been a central feature of restructuring of natural gas and telecommunications industries. The objective has been to separate monopolistic segments of the industry from those that can be opened to competition.

Privatization of electric utilities and other industries has occurred in a number of countries. Reasons for such action have included: the need to introduce competition, thereby improving productive efficiency, ideological considerations, bankruptcy of the public purse, and the desire to provide a countervailing force to union power. We note that privatization of hydraulic generation, which has been viewed as a 'heritage' asset, has generally not been undertaken even in the presence of restructuring.⁴ Furthermore, in some jurisdictions, such as the U.K., private companies with far too much market power were created, thus hindering the original objective of creating competition.

⁴ Norway and New Zealand are both rich in hydraulic assets. Neither has privatized these. The U.K. has little hydraulic generation. It privatized fossil generation and has been trying to privatize nuclear generation.

FIGURE 4
OPTIMAL PLANT SIZE
Per-MW Cost Curves (1930-90)



While there was initially considerable interest in retail access, many jurisdictions have either rejected it, retreated from it, or are implementing a version which does not achieve the original objectives. Regulators and many industry stakeholders have come to the realization that retail access is still a theoretical concept with many unresolved technical issues.

Efforts to attain lower rates and institute stronger accountability have resulted in municipalization efforts in a number of jurisdictions.

In some jurisdictions there has been a movement away from average cost pricing to market pricing. Such change is not justified until the institutions are put in place so that competition in generation is irrevocable. Otherwise, the incumbent will be in a position to foil new entrants using predatory pricing.

Broader public policy trends have included liberalization of trade, decentralization, and devolution of power to lower levels of government.

These decentralizing forces stand in contrast to growing environmental concerns which usually require some form of centralized action. While environmental reform has become attenuated in recent years due to recessions and lower economic growth, its prominence will increase as we move to the next century. Where electricity restructuring has taken place, it has been under the assumption, if not the assurance, that environmental objectives could still be achieved by regulation or market mechanisms.

B. BARRIERS TO CHANGE

A number of issues specific to Ontario need to be taken into account when assessing desirable changes to the electricity industry in Ontario. These include

the existence of monopoly power, current excess capacity at Ontario Hydro, the nature of Ontario Hydro's existing assets and the very large associated debt, and the current ownership structure.

Ontario Hydro Monopoly Power

The single most important institutional obstacle to change is Ontario Hydro's enormous monopoly power. The corporation not only controls virtually all generation and transmission in the province, but it also distributes 30% of the electricity. The company regulates its own rates as well as those of municipal utilities. Under current arrangements, its monopoly is underwritten by existing legislation.

Ontario Hydro's sheer size (by some measures it is the largest electrical utility in North America) gives it economic, political and financial clout. A mis-step could bring down the financial rating of the Province.

Despite the internal changes the company has undergone in recent years, two facts cannot be contested. First, Ontario Hydro did not introduce such changes *until* it came under pressure from the outside. In fact, during the 1980s it insisted before the Ontario Energy Board that it operated efficiently and that continued growth in staff and OM&A budgets were justified; these assertions have been flatly contradicted by subsequent events. Second, no changes have been implemented that would *institutionalize* competition in generation in the province. Ontario Hydro has, and can exercise overwhelming market power.

Ontario Hydro's Control of Transmission

A major source of Ontario Hydro's monopoly power is its control of the transmission system. This control presents a formidable obstacle to the creation

of competition in generation because of the risk of self-dealing and cross-subsidization of its own generation.

Complete separation of this and other natural monopoly components of the industry (in particular distribution) is the essential first step to restructuring the industry.

Excess Capacity and Debt

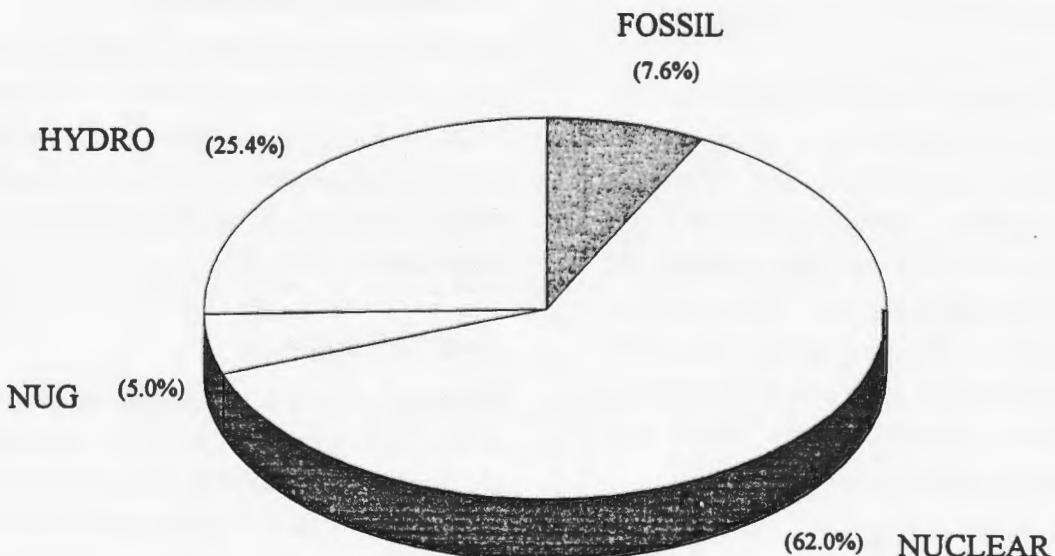
Despite the cancellation or deferral of a number of capital projects, Ontario Hydro currently reports substantial excess capacity which will require several years to absorb. This excess capacity puts upward pressure on rates which in turn increases the

incentive for exit by large industrial users and municipal utilities.

Ontario Hydro also has about \$35 billion of long term debt and a debt ratio of about 90%.

A major exodus of customers would create stranded assets, the costs of which would be borne by the remaining (captive) customers or by taxpayers. The current Non Utility Generation (NUG) agreement signed by Ontario Hydro, the Municipal Electric Association and the Minister of Environment and Energy, inhibits exit that would harm the public interest.

Figure 5: ENERGY PRODUCTION



Source: 1995 data from Ontario Hydro 1996 Corporate Budget

It may be necessary to restrict entry into generation supply for several years to prevent uneconomic bypass.⁵ However, such control over the market should not reside with Ontario Hydro.

Generation Mix

Privatization of the electricity industry has been taking place around the globe, and these developments have led to a debate about whether Ontario Hydro should be privatized. It is important to note that on a more pragmatic level, complete privatization of all of Ontario Hydro's business units, would present practical difficulties.

Ontario Hydro has a large quantity of debt which will take some time to reduce and this presently makes it unattractive to investors. But the much larger risk is nuclear.

The largest share of energy produced by Ontario Hydro comes from the three nuclear generating facilities in Ontario (see Figure 5). There are arguments for maintaining a high degree of coordination of these three nuclear facilities in order to optimize capability factors and outages.

The cost risks associated with the nuclear facilities are considerable - investors would want significant concessions from both federal and provincial governments regarding their responsibility for nuclear waste disposal and their responsibility for nuclear station decommissioning. There are also indications that the Ontario public would be concerned about the safe operation of the nuclear plants under private ownership, even though they would continue to be regulated by the AECB.⁶

⁵ Uneconomic bypass results in inefficient use of resources by society as a whole as a result of incorrect price signals.

⁶ The U.K. government had planned to privatize its nuclear generation, but found that investors were not interested. Recently, the U.K. government has decided to try again. Concerns regarding

Hydroelectric stations produce about 25% of electrical energy in Ontario. While the hydraulic facilities would be attractive to investors, there would likely be public opposition because of the unique nature of some of these assets, in particular the facilities at Niagara Falls. In any event, the 'market value' of hydraulic facilities would be influenced by a number of factors including the revenue stream, the water rental charges that the Province would impose on the owner, and the degree of regulation.

The fossil fuelled generating facilities are essentially the 'swing fuel' in Ontario. The expected amount of energy output from this source is the most difficult to forecast since it depends on nuclear performance and unpredicted shifts in demand. Existing provincial acid gas limitations further restrict potential output of the fossil stations, and there is some uncertainty about future limitations as the Federal Government deals with its commitment to cap greenhouse emissions by the year 2000 at 1990 levels.

Ownership of Ontario Hydro

In Ontario, the municipal utilities have never relinquished their claim to the ownership of Ontario Hydro whose equity was accumulated largely through their contributions. Such ownership issues must be addressed prior to disposition of any Ontario Hydro assets.

Rural Distribution

Currently, provincial legislation requires a subsidy of rural residential rates by other customers. Any contemplated institutional changes would need to determine how such subsidies should be financed.

potential liabilities associated with the nuclear plants and nuclear waste are still discouraging investors. Retention of these liabilities in the public sector could be considered illegal state aid under the European Commission rules. U.K.'s Independent on Sunday, December 17, 1995.

C. POLICY DRIVERS THAT SHOULD GUIDE RESTRUCTURING

Customer Benefits Should Be The Overriding Objective

The single most important policy driver is maximizing benefits to customers.

Equity considerations between customers require that all customers should gain from the changes to the industry.

III. THE ESSENTIALS OF RESTRUCTURING

A. STRUCTURE / COMPETITION

Separate Monopoly from Competitive Portions of the Industry

The empirical evidence on anti-competitive behaviour of vertically integrated monopolies is extensive. The history of the gas and oil pipeline industries is replete with examples of pipeline owners favouring their own sources of supply. Indeed, deregulation of natural gas in the U.S. involved separation or unbundling of transmission from supply. Such considerations also formed the basis of divestiture in the U.S. of the Bell operating companies from AT&T. (Local service was seen to create a bottle-neck monopoly.⁷)

The *prima facie* case that a public or private corporation with monopoly power will act to preserve and advance its interests, which include retention of monopoly power, is strong.⁸ Thus, the regulatory blueprint has often involved separation of the portions of the industry that are potentially competitive from those that are natural monopolies.

⁷ "Halfway Home: U.S. Telecommunications (De)Regulation in the 1970s and 1980s", by Robert Crandall, in *Regulation*, Jack High Ed., (University of Michigan Press: 1991).

⁸ For discussions of the elements of the objective function of private and public firm see e.g., Baron, Dave P. and R. Myerson "Regulating a Monopolist With Unknown Costs", (1982) *Econometrica*, Vol. 50, No. 4, 911-930; Besanko, D. "On the Use of Regulatory Requirement Information Under Imperfect Information", (1985), in M. Crew, ed., *Analyzing the Impact of Regulatory Change in Public Utilities*, Lexington Books, Lexington, MA; Laffont, Jean-Jacques and Jean Tirole, "Using Cost Observations to Regulate Firms", (1986), *Journal of Political Economy*, Vol. 94, No. 3, 614-641; Waverman L. and A. Yatchew "Regulation of Electric Power in Canada", forthcoming in *International Comparisons of Electricity Regulation*, R. Gilbert and E. Kahn, editors, (Cambridge University Press: 1996).

In the electricity business, transmission and distribution continue to be natural monopolies. The technologies and economics of generation now permit competition. The single most effective step that can be taken towards introducing competition is complete separation or unbundling of these functions. This will separate the interests of the owners of transmission and distribution from the interests of the owners of generation capacity. The alternate approach -- legislated access to transmission facilities of vertically integrated utilities -- requires constant regulatory supervision to protect against self-dealing and other abuse of market power and hinders further restructuring efforts.⁹

Institutionalize Competition -- Remove Ontario Hydro Monopoly

In the last several years, Ontario Hydro has undergone massive internal restructuring. There have been dramatic reductions in staff. Hydro has also been re-organized so that various generation, transmission and distribution functions reside in separate business entities.

However, none of these actions have altered Hydro's monopoly control of the industry in Ontario. The Corporation currently has control of almost all transmission and generation in the Province, and a significant portion of distribution. It regulates its own rates and those of municipal utilities. Its sheer size gives it enormous economic and political clout, particularly when compared to generation suppliers that will constitute the source of competition in the Province. The statutes governing Ontario Hydro

⁹ Even a 'convergence' view of the world is enhanced by complete separation of generation from the 'wires' business.

provide the legal basis for effective monopoly control of the industry in Ontario.

The internal restructuring that Hydro has undergone in no way prevents it from exercising this monopoly power. While such power may have been justified at earlier points in the development of the electricity industry in Ontario, it is no longer desirable or necessary. Indeed, it is an impediment to competitive evolution of the industry.

Vertical unbundling and divestiture would substantially reduce Hydro's monopoly control and should therefore be undertaken immediately. Hydro's legal monopoly over electricity supply should also be removed by transferring control over supplier entry to an electricity regulator who will oversee the restructuring of the industry and the transition to competition in generation.

Vertical unbundling combined with removal of Hydro's legal monopoly will also increase pressure on the Corporation to continue to put its financial house in order. More importantly, these two changes will begin to institutionalize a competitive framework for the industry. The long term success of the industry in serving its customers cannot rely upon benevolent actions or decisions made from within the dominant company in the industry. It must ultimately reside within institutions -- both market and regulatory -- which, directly and indirectly, impose restraints on, and provide incentives to, the Corporation, its descendants and other market participants.

Avoid Irreversible Changes

In principle, many industry changes can be reversed. In reality, the political and economic costs of reversing certain changes are so high that alternate and less preferable mechanisms are ultimately adopted.

Three changes that are difficult to reverse are privatization, retail access and expansion of monopoly power. In various sections below and in other parts of our submission, we provide extensive arguments and elaborations of the propositions which we only summarize here in general terms:

- **Privatization:** private ownership has consequences that are difficult to reverse. So much so, that countries where electricity is in the public sector have adopted substantially different restructuring paths than the U.S. where electricity is supplied largely by private companies. The legal and political complexities resulting from private ownership have made vertical separation and divestiture much more difficult in the U.S. Consequently, that country has adopted transmission access as its initial step towards competition. These observations do not imply that privatization should be precluded. They do imply that privatization should not take place until the essential objectives of restructuring are fully implemented. Most important among these is separation of generation, transmission and distribution.¹⁰

- **Retail access:** bilateral contracts between suppliers and distributors or end-users create private (contractual) property rights which would be extremely difficult to reverse. Furthermore, once retail access is available to domestic suppliers, NAFTA provisions would require access for U.S. suppliers. At that point retail access could no longer be altered by Provincial authorities. While competition from outside Ontario may be desirable in the long run, in the immediate future it would risk creation of stranded (nuclear) assets.

¹⁰ See also "Regulation, Public Ownership and Privatisation of the English Electricity Industry" by D.Newbery and R.Green on restructuring in the United Kingdom forthcoming in *International Comparisons of Electricity Regulation*, R. Gilbert and E. Kahn, editors, (Cambridge University Press: 1996). They refer to the 'option value of public ownership'. Under public ownership, far-reaching reforms are easier than if private interests are to be restructured.

■ **Expansion of monopoly power:** two proposals put forth by Ontario Hydro would expand its monopoly power. The first is merger of distributing utilities with itself. This is anti-competitive and would reduce a major source of pressure on Hydro to continue stream-lining and cost reduction. Second, Ontario Hydro has indicated a number of legislative changes it considers necessary. Among these are increased discretion with respect to repayment of debt, increased flexibility to invest in telecom, the right to cross-subsidize and the freedom of action permitted business corporations in Ontario.¹¹ These legislative changes should not be permitted until Hydro has been vertically unbundled and until it faces the discipline of the market. Expansion of Ontario Hydro monopoly power would be difficult to reverse and it would hinder future restructuring efforts. Furthermore, it risks Hydro investment in businesses for which the rate-payer or tax-payer will ultimately be responsible.

B. OWNERSHIP

Irreversibility of Private Property Rights -- Why the U.S. Has Not Unbundled

The creation of separate transmission companies has been undertaken in the U.K., New Zealand, Norway and Sweden. In each case transmission was in the public sector.

On the other hand, in the U.S., where most transmission (and generation) is in the private sector, competition was institutionalized by legislating transmission access in the 1992 Energy Policy Act.

¹¹ *Competition, Convergence and Customer Choice*, Ontario Hydro, Sept. 30, 1995, 62-65.

To date, no divestiture has been ordered,¹² though the California Public Utilities Commission has ordered the creation of an 'Independent System Operator'. This entity will control the transmission system. Indeed, the California Public Utilities Commission has stated:

"We have determined that the vertically integrated electric utility is not a compatible model if we are to foster a competitive market for electric services."

There is a simple explanation for the differing approaches. Divestiture of transmission assets, in the presence of private property rights, involves a difficult, costly and drawn-out process. (The unwillingness of utilities to divest themselves of transmission assets underscores their monopoly and strategic value.)

However, when transmission is in the public sector, separation can be effected relatively more easily. Thus, it is not surprising that the U.S. has taken a different path from most other countries.

The lesson to be drawn from these experiences is that privatization should not even be considered until the natural monopoly components of the industry (transmission and distribution) are fully separated from those amenable to competition (generation).

Failure to do so can result in the kinds of undesirable outcomes that have occurred in the U.K. where observers have commented: "...the failure of the UK government to establish appropriate structures of industries prior to privatization has left

¹² Divesture did take place in restructuring of the U.S. telecommunications industry. Legal proceedings lasted a number of years.

a lasting legacy of inefficiency in many of the privatized utilities.”¹³

Public Monopoly vs Private Monopoly -- Which Is Better

Conventional property rights arguments assert that privately owned companies are likely to be more efficiently run than those in the public sector. Public ownership is far too diluted to provide an adequate lever on company performance. In centrally planned economies, the absence of both market forces or political pressures has resulted in woefully inadequate performance of state firms.¹⁴

In mixed economies, there are typically two breeds of companies in industries that are natural monopolies: publicly owned firms and regulated private enterprises. The governance structure of each is subject to its own vulnerabilities, limitations and ultimately failures. Public corporations do not have the profit motive but often appropriate monopoly rents in other ways (e.g., for the benefit of labour or for policy purposes). Given their more direct accountability to political bodies, residential and commercial rates of public enterprises are often lower than those at private utilities. Private regulated enterprises, particularly those that are regulated on a rate of return basis, are subject to distortions and inefficiencies.¹⁵

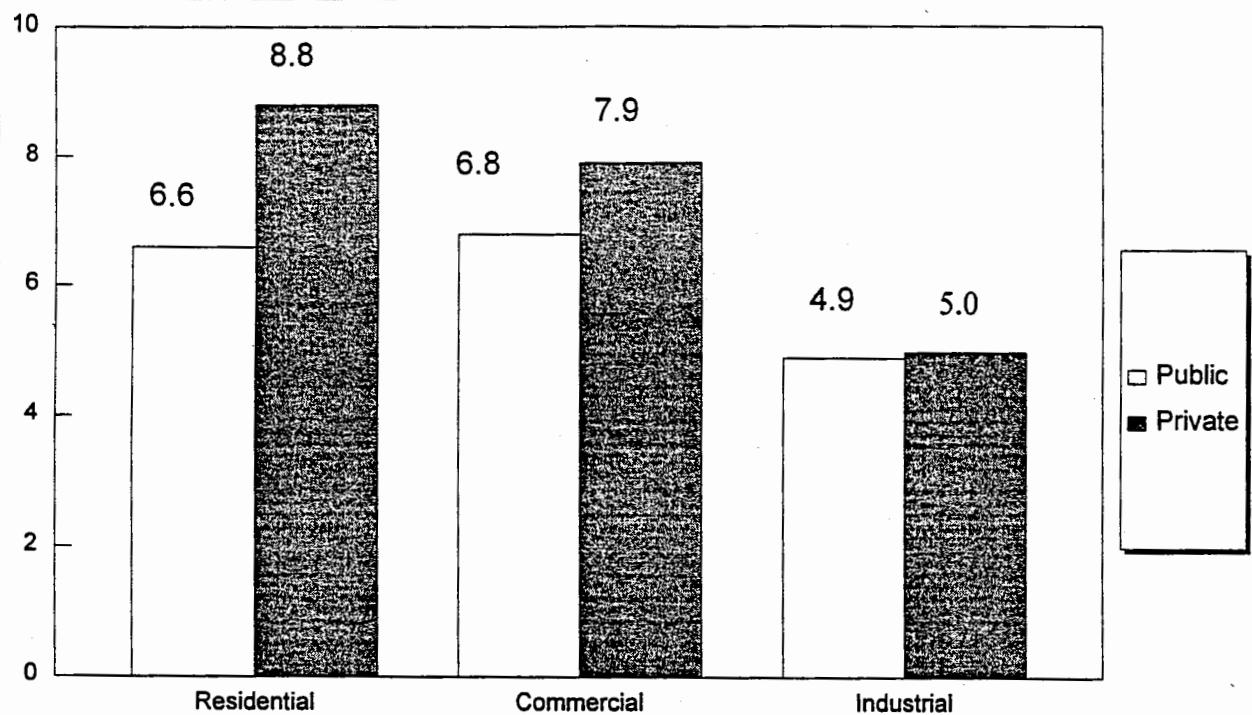
¹³ M. Bishop, J. Kay and C. Mayer, *Privatization and Economic Performance*, p.3.

¹⁴ See Hirschman,A.,*Exit Voice and Loyalty: Responses to Decline in Firms, Organizations, and States*, (Cambridge, MA: Harvard Univ. Press, 1978). Exit refers to the option to seek product elsewhere, an option available in the competitive market place. Voice refers to political pressure which can be brought to bear in order to bring about change in public sector corporations. In Ontario's electricity market the 'exit' option is unavailable except perhaps to large users and the 'voice' option is severely constrained because of asymmetric information and the absence of a proper regulator over Hydro.

¹⁵ Over-investment in capital, the Averch-Johnson effect, is one such example.

Figure 6: Electricity Rates: Public vs. Private

U.S. Average Revenue Per kWh (U.S. cents)



Source: U.S. Dept. of Energy. See Public Power, Jan. - Feb. 1995

In the U.S., public utility rates are substantially lower than those at privately owned utilities (see Figure 6). Furthermore, the most recent econometric analysis of U.S. data concludes that, even after adjusting for scale of operation, factor costs, access to hydroelectric sites, taxes and capital cost discrepancies, U.S. public electric utilities have lower electricity rates than private utilities.¹⁶ The relevance of these results to the present discussion is that privatization of *natural monopoly* components of the industry (transmission and distribution) is unlikely to convey significant societal benefits.¹⁷

Finally, public ownership of transmission and distribution protects against re-integration of these segments with competitive portions of the industry (in particular, generation) since sale and merger of monopoly assets would require consent of the government.¹⁸

If You Privatize, Create Small Companies

The British electricity industry restructuring, in which two large private and one large public (nuclear) generator were created, has taught us that, with few market participants, anti-competitive and even collusive behaviour is likely to occur.

In a prescient observation made well in advance of privatization, Professors Beesley and Littlechild (the latter is the current U.K. electricity regulator) stated: "When in doubt, smaller rather than larger successor

¹⁶ See Kwoka, J. "Pricing in the Electric Power Industry: The Influence of Ownership, Competition and Integration", (1995: Harvard Institute of Economic Research Working Paper).

¹⁷ In the U.K., there is evidence that private distributors have been overcharging. As a consequence, the regulator has put severe restrictions on distributor margins. See *Distribution Price Controls: Proposals*, Office of Electricity Regulation, August 1994.

¹⁸ In the U.K. where distribution and transmission is in the private sector, such re-integration has begun and has now come under the scrutiny of the regulator and the Monopoly and Mergers Commission.

companies should be created, and allowed to merge thereafter, subject to rules of competition..."¹⁹

Privatization of *large* companies with considerable market power would bring greater proceeds upon sale but would also result in less competition and higher rates to customers. The usual societal inefficiencies attributable to monopolies would not be overcome.

Privatization of *small* companies in a competitive environment would lower sale proceeds but would also result in lower electricity rates. (The companies could be free to merge or to form strategic alliances at some point in the future as long as excessive market power did not result.) This approach would also better prepare the Ontario electricity industry for competing in U.S. markets. Indeed, vigorous domestic competition is excellent preparation for successful penetration of international markets.²⁰

C. REGULATION

Background

Government intervention in the economy is usually justified on the basis of failures of the market to arrive at socially optimal outcomes. In the electric utility industry, the three most important market failures are the absence of competition, (e.g. as a result of natural monopoly), the absence of an 'obligation to serve' in the normal marketplace²¹ and

¹⁹ "Privatization: Principles, Problems, and Priorities", *Lloyds Bank Review*, July 1983.

²⁰ See *Competitive Advantage of Nations*, Michael Porter.

²¹ There is no obligation to serve in the gas industry. As a consequence, portions of the province have no access to this energy source. While this may be socially optimal for natural gas, electricity has been considered essential for many years leading to a mandated obligation to serve.

the presence of environmental externalities which are not properly taken into account by the market.

In developing regulatory policy, internal consistency should be maintained while minimizing the direct and indirect costs of regulation. For purposes of assessing regulatory alternatives, a number of questions need to be addressed:

- what is the proper scope of regulation? to what degree should government be involved in economic decisions? what should be the relationship between the regulator and the regulated?
- how should environmental externalities be dealt with? should environmental policy deal collectively with all energy sectors, or should separate policies be implemented for each energy sector?
- to what degree are the benefits of competition compatible with regulatory control and environmental goals?

Underlying the regulatory recommendations that form part of the MEA model are several themes which must be taken into account in devising a rational regulatory strategy and policy. We now turn to a brief discussion of these themes.

Competition Where Possible, Regulation Where Necessary

Competition and the market should be relied upon where possible, regulation should be relied upon where necessary. Markets that can be successfully deregulated should be. When market failures are present, the preferable route is to correct the market

failure rather than to supplant it with some other process or institution.²²

Clear Delineation of Roles

There should be clear delineation and separation of the roles and responsibilities of all industry participants. Clarity of purpose increases transparency, enhances accountability and promotes efficiency. The principal role of the electricity producers should be to provide electricity at the lowest feasible cost, consistent with health, safety and environmental standards. The principal roles of government should be to set environmental goals, to set health and safety standards and to ensure that adequate protection exists against monopoly exploitation. The principal role of the regulator should be to interpret and administer government legislation and to promote competition wherever it is beneficial to do so. Separation of these functions reduces the risk of regulatory failure.

Comprehensive Approach to Pollutants

A rational and coherent approach to environmental issues should include all current and potential sources of pollution. Thus, the electricity industry should not be singled out as the principal target of environmental control. Doing so would cause distortions in energy markets. Instead, encompassing legislation and policy should be developed that incorporate in addition to Ontario Hydro, non-utility and other generators, as well as fossil fuel producers and users.

²² For example, correction of an environmental externality using mechanisms which internalize the externality in the price of electricity are preferable to centralized approaches such as integrated resource planning.

Distinct Segments of the Industry Require Different Regulatory Remedies

Generation, transmission and distribution each have differing characteristics which will require regulatory remedies specific to them. For generation, the object of course, is replacement of cost and capital regulation with competition. Regulation of environmental and safety matters would continue.

The transmission system serves multiple key functions which will require regulation at the provincial level. Obtaining a good comparison group for the regulation of transmission costs will be difficult given its unique nature.

On the other hand, the presence of a large number of distributors in Ontario provides a good statistical basis for cost comparisons. This in turn provides an important tool for the implementation of yardstick competition /regulation, (an approach that is unavailable at the transmission level).

Regulatory Authority Should Reside With the Lowest Level of Government Competent to the Task

One of the policy trends identified above is decentralization in government. Decentralization is desirable because it increases direct accountability and responsiveness to the most affected community or constituency.

Activities that have impacts principally within the Province should be regulated by the Province and not at the federal level. Similarly, activities that have impacts principally at a local level should be regulated at that level so long as such regulation can be effected competently, effectively and efficiently.

D. TRANSMISSION / DISTRIBUTION ACCESS

Overview

The companion report prepared on behalf of the MEA and entitled *Retail Access vs the Pool Purchaser Model*, contains a detailed analysis of the pros and cons of various retail access models. That paper concludes that retail access is inappropriate for Ontario. Here we briefly summarize the main arguments.

Retail access has been considered in other jurisdictions. However, it has either been rejected or delayed in most U.S. jurisdictions. (See paper on Developments in Other Jurisdictions.)

In a few instances, it has been implemented in a limited fashion. One such example is the Bonneville Power Authority, a federally owned utility in the Pacific Northwest. This utility has a small number of direct customers (large industrials) as well as supplying a large number of utilities. When, in 1995, contracts with direct customers expired and they were in a position to seek supply elsewhere, Bonneville offered to exempt them from stranded investment cost recovery charges if they signed five year contracts for at least 80% of their power. As a consequence, costs associated with nuclear investments and environmental mitigation liabilities have been transferred to the remaining (captive) customers.

In the U.K., retail access is available to large customers and medium sized customers. Access for other customers is yet to be implemented. Consumers, however, have received relatively little benefit subsequent to restructuring. Most benefits have gone to shareholders.²³

²³ See G.Yarrow, "Power Sector Reform in Europe with Special Reference to Britain and Norway", paper presented at the American Economic Association meetings, January, 1995.

Retail Access Should Be Rejected

As we have indicated earlier, many jurisdictions have either rejected retail access, retreated from it, or are implementing a version which does not achieve the original objectives. The two issues that pervade virtually all discussions of restructuring are vertical separation of integrated monopolies with the objective of reducing their monopoly power and the recovery of costs associated with stranded assets. Regulators and others have come to recognize the inherent difficulties in implementing retail access.

Implementation of retail access in Ontario, would be inappropriate for a series of reasons. The MEA model of wholesale competition, which is discussed extensively in later sections of this paper, (see also Figure 8: Recommended Institutional Structure), better protects customer interests and minimizes risks associated with existing assets without foreclosing the retail access option in the future.

- **Stranded Assets:** Ontario Hydro has very substantial debt obligations associated particularly with its nuclear facilities. Under retail access, there is serious risk that uneconomic bypass, especially by large industrial customers would occur, seriously threatening the financial viability of existing assets.

- **Irreversibility:** once retail access is permitted, it must be available on a non-discriminatory basis to all suppliers including those in the U.S. The large number of private contracts that would be put in place (in some cases among international parties), would be very difficult to reverse.

- **No Reciprocal Right of Access to U.S. Markets:** open access to Ontario electricity markets does not imply a reciprocal right of access by Ontario producers to U.S. markets. Thus, Ontario could suffer significant stranded assets as excess U.S. capacity is unloaded here.

- **Equity Considerations:** availability of retail access to large industrial customers without similar opportunities for residential and other small customers, could result in an unfair transfer of costs to the latter. In any event, permitting some customers to leave without 'making the system whole', penalizes those that are captive.

- **Loss of Economic Dispatch:** currently the transmission system operator (Ontario Hydro) determines the output of different generators in order to minimize overall system costs. Implementation of retail access could lead to the loss of these benefits.

- **Obligation to Supply Will Disappear:** under retail access, market forces would need to be relied upon to ensure that adequate supply is available. This may be politically unacceptable as many customers are fearful that supply would be inadequate.

- **Costs of Retail Access:** generation supply accounts for the dominant portion of electricity costs -- about 70% in Ontario. Retail *supply* typically accounts for less than 3%. (Remaining costs are for transmission and distribution.) Vigorous competition at the wholesale level will exhaust most competitive benefits. Any benefits of extending competition to the retail level are questionable and limited by the relatively small proportion of final price that corresponds to the retail supply business.²⁴ Furthermore, they would likely be outweighed by the additional transactions costs that end-use customers incur in procuring their needs through marketers and brokers. Indeed, metering costs and other technical problems make implementation of retail access for all customers impractical.

²⁴ In the U.K., generation accounts for about 65% of costs, transmission for 7%, distribution for 25% and supply for 3%, "Problems of Yardstick Regulation in Electricity Distribution", T. Weyman-Jones, in *The Regulatory Challenge*, M. Bishop, J. Kay and C. Mayer, eds., p424.

E. THEORIES OF CONVERGENCE

Economies of Scope

At their heart, convergence models assume that there will be significant economies of scope for a single firm providing a range of infrastructure services such as electricity, gas, information/telecom, energy services, home security and water/sewage.²⁵ Some of the services being contemplated do not even exist today. In the analysis, it is essential not to confuse potential economies of scope amongst end-use services, such as those described above, with economies of scope that some argue exist amongst the vertical layers of the industry -- i.e., among generation, transmission and distribution.

A detailed analysis of convergence models and Ontario Hydro's particular variant may be found in the companion paper *Retail Access vs the Pool Purchaser Model*. In the following section we briefly summarize the arguments which underlie MEA rejection of Ontario Hydro's convergence model.²⁶

At the outset it should be emphasized that Ontario Hydro's particular vision of convergence does not propose divestiture of transmission and distribution but argues in favour of a "multi-business model with separate governance". This arrangement leaves open the possibility of future re-integration which Ontario Hydro believes will be important for development of a converged service delivery industry. We will argue that this proposal is fundamentally contrary to public interest.

²⁵ We note that about a third of Ontario municipal distributors are parts of public utility commissions providing multiple services.

²⁶ *Competition, Convergence and Customer Choice*, Ontario Hydro, Sept. 30, 1995.

Vertical Unbundling

Setting aside the question for the moment about returns to scope in providing a range of services to the end-user, convergence theories do not undermine the fundamental arguments for *vertical unbundling* of Ontario Hydro into separate generation, transmission and distribution entities.

For the natural gas industry we know that production, bulk transmission and distribution can be separated without adverse consequences. Nor does an unbundled structure prevent the overlay of energy services in that industry. On the contrary, competition and the search for profitable new activities spurs the development of energy services.

Similarly, in telecommunications, local networks can be separated from long distance systems without adverse consequences. The structure has not prevented growth in user services. They have expanded with great rapidity.

Indeed, it is hard to see how providing (combinations of) *end-use* services requires vertical integration of the electricity industry.

In short, claims of economies of scope in end-use services do not imply any similar economies of scope between generation on the one hand, and the network, (i.e., transmission and distribution) on the other.

Thus, the MEA proposal of complete separation of generation, transmission and distribution can be effected without undermining the development of multiple end-use services.

Technological Risks

The information industry is extremely volatile with great risks of obsolescence. The product life cycles in recent years have been in the order of a few

years. And, there is a great diversity of potential technologies competing to become the industry standard.²⁷ An erroneous investment could result in huge financial losses.

It is not clear that electric utilities, whose asset lifetimes are several decades, can prosper in a marketplace that is fundamentally so dynamic.

A recent study by the U.S. Electric Power Research Institute (EPRI) examined the potential for successful participation of electric utilities in the information services industry. The study concluded that the potential role for electric utilities was as a niche participant.²⁸

Cross-Subsidy Risks

In the event of a failed investment, the electricity rate-payer would bear the costs unless such investments were fully segregated and financed by private funds.

Furthermore, constant regulatory surveillance would be required in order to ensure that costs associated with the competitive and hence unregulated businesses were not being subsidized by regulated portions of the business.

²⁷ Novell, Inc., a computer network software company, is currently experimenting with a software based technology that could transmit large quantities of information to *and from* end-use customers directly over power-lines. Such a technology would obviate the necessity of installing expensive fibre-optic, co-axial cable or resorting to cellular links and could simply be licensed to utilities. "Electric/ Telecom Alliances: Utilities Partner for the Future", J. Schuler, *Public Utilities Fortnightly*, December 1995.

²⁸ "Business Opportunities and Risks for Electric Utilities in the National Information Infrastructure", EPRI Project TR-104539, Preliminary Report, October 1994.

Ontario Hydro's Convergence Model Should Be Rejected

Theories of convergence, as advanced by Ontario Hydro and its peers, could very well be the last refuge of large vertically integrated and monopolistic utilities. With economies of scale gone, economies of scope are the only hope.

Arguments that Ontario Hydro will soon be operating in a much larger market which will limit its monopoly power are implausible. Limited interconnections with neighbours will preserve Ontario Hydro market power.

Furthermore, the experience in the U.K. with three generating companies demonstrates that considerable market power can be exercised even in the absence of control of the grid.

Ontario Hydro, as it is restructured, should focus on its core business and concentrate upon reducing its debt as quickly as possible. It faces ample technological risk in its nuclear operations. It is in the best interests of the rate-payer if the battle for the information industry is left to others.

In the end, convergence amongst various infrastructure services, could very well occur. But the public interest is served only if it is pursued by multiple entities (with the possible involvement of distributors) who do not have the enormous market power of Ontario Hydro and who face the market test both in product and capital markets.

IV. THE MEA MODEL: COMPETITION IN GENERATION / POOL PURCHASER MODEL

A. STRUCTURE / COMPETITION

Vertical Unbundling

The high voltage grid is a complex system. Transmission of electricity is only one of its functions. The grid plays a critical role in ensuring the reliability of the whole electricity system since the activities of any generating station connected to the grid or deficiencies in a major component transmission line can cause other failures within the system. In addition, the grid operator acts as the dispatcher ensuring that demand and supply are balanced at any given moment. In order to fulfil these three grid functions -- transmission, reliability and dispatch -- it is essential that the grid be controlled and operated by a single entity.

This entity must be responsible for maintenance of the grid, (transmission system performance declined in the recent past as a result of inadequate maintenance expenditures by Ontario Hydro). Planning, design and construction of new transmission facilities also fall naturally within the purview of the entity performing the transmission function.

While the transmission function is technically complex, requiring precise coordination between the transmitter and the generators, there is no strong technological reason preventing its separation. Ontario Hydro's organizational structure currently segregates transmission into a separate entity. Indeed, the existence of separate transmission companies in other jurisdictions supports the feasibility of such a partition.

Separation would provide important advantages:

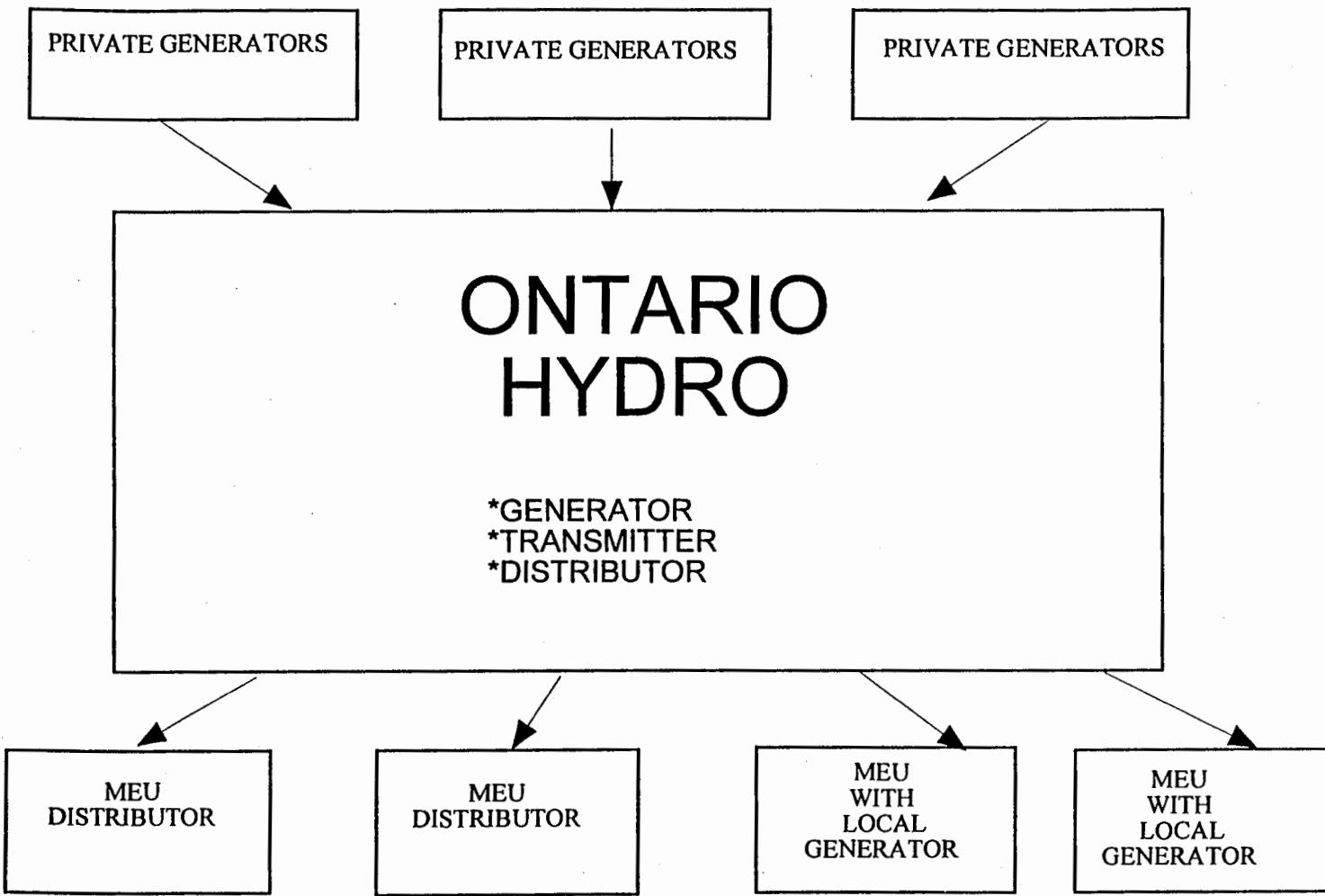
- Separation of transmission is the only efficient and effective way of preventing self-dealing and creating a level playing field for all current and future generators -- public or private.
- Separation assures the transparency of transmission vs generation and distribution costs since these would flow from the expenses of separate firms.
- Separation better positions the industry for regulatory developments. Since transmission is likely to continue to be a natural monopoly for the foreseeable future, regulation by a government agency will in all likelihood continue. On the other hand, regulation of generators is likely to recede as this segment of the industry becomes more competitive.

Obligation to Serve/Supply Devolves to Distributors

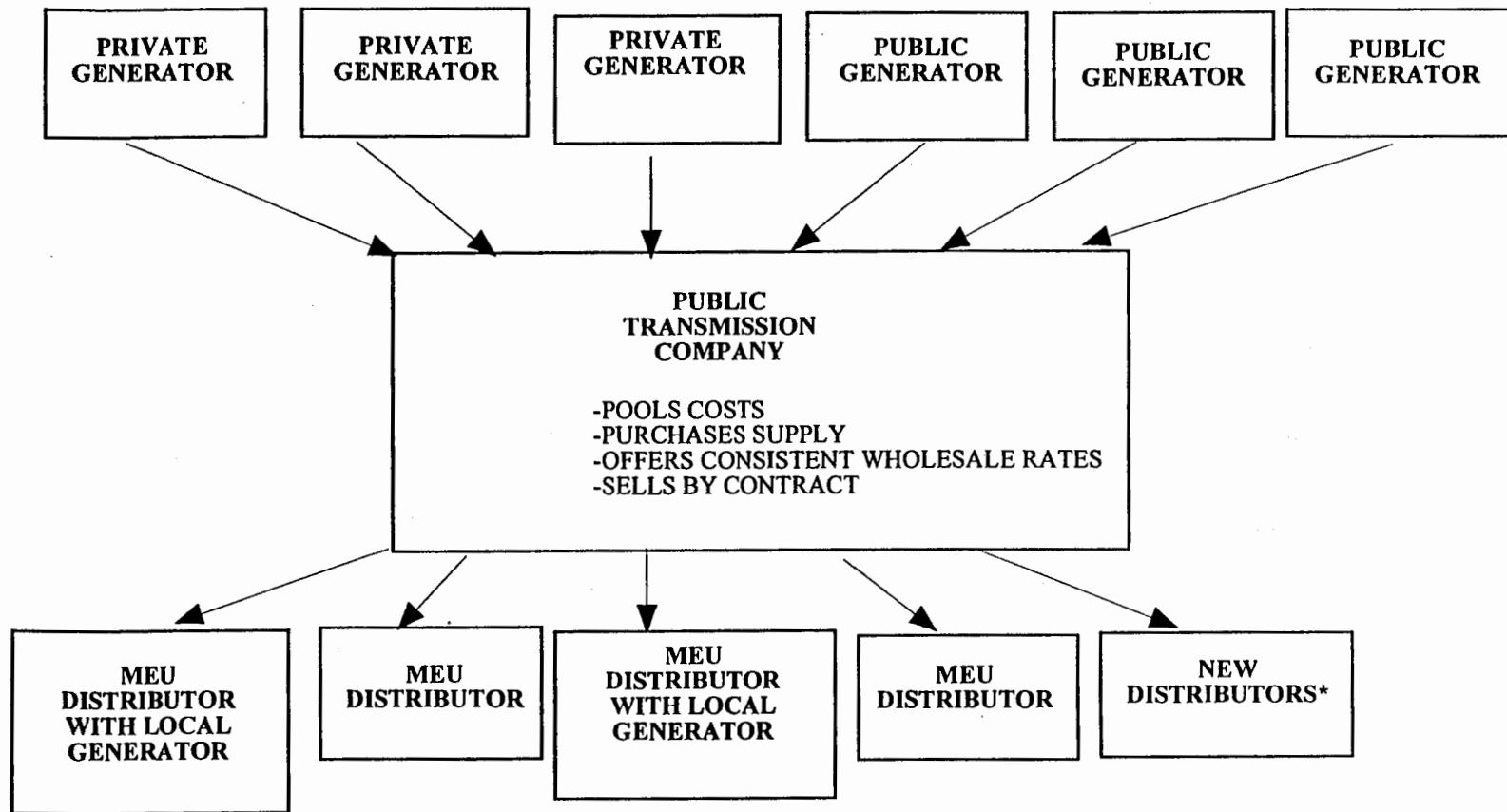
Common to many electricity systems world wide is an 'obligation to serve', a concept by which an end use customer must have access to electricity and the system is required to meet all reasonably expected demand. Access is the key to this obligation; rules about costs and conditions of service vary across jurisdictions and have changed over time.

In Ontario, municipal utilities must service all customers within their franchise areas. Ontario Hydro, reflecting the pooling of municipal and other customer interests, has an obligation to meet the needs of the municipal utilities and its own retail customers.

Figure 7:
EXISTING INSTITUTIONAL STRUCTURE



**Figure 8:
RECOMMENDED INSTITUTIONAL STRUCTURE**



*ONTARIO HYDRO'S CURRENT DISTRIBUTION FUNCTION WILL DEVOLVE TO NEW DISTRIBUTORS

Under the proposed restructuring, the obligation to secure adequate supply would devolve back to the distributing utility. Relieved of this obligation, Hydro could compete with other generators on a level playing field.

To summarize, it is clear that there would be strong political pressure to ensure that *some* entity has an obligation to secure adequate supply. Decentralizing this obligation to the level of the distributing utility has distinct advantages:

- it relieves Ontario Hydro of this responsibility and allows it, (or its descendants), to compete more effectively with private generators;
- endowing distributing utilities with this obligation enhances political accountability which would be to local governments rather than to the provincial government.

Grid Acquires Supply on a Competitive Basis

The transmission company is in the best position to operate the wholesale market for electricity. Under the proposed structure, (see Figure 8), each distributor would forecast requirements and arrange contracts of varying duration with the pool operator. The pool operator would then aggregate the demands and arrange matching supply contracts through a competitive bidding process. Suppliers could be public or private companies.

The pool operator would also operate a spot market for electricity in order to satisfy any un-contracted demands. It is expected that distributors would seek to satisfy most of their needs through long term contracts.²⁹

²⁹ Secondary sales and purchases are not illustrated in the figure above depicting the proposed institutional structure, but would be performed by the transmission company.

Retail access and wheeling would not be permitted.

Wholesale Cost Pooling

Under the current system, all common wholesale costs across the province are pooled and utilities with comparable load characteristics are charged similar rates regardless of their location. This results in rate equity and a form of risk sharing by the various distributors who would otherwise face greater price uncertainty driven by local supply and availability conditions.

Under the proposed system, the menu of contracts available to each utility at any point in time would be identical. This would continue to provide some degree of risk sharing amongst utilities. However, aggregate wholesale electricity *costs* for a utility would depend on the portfolio of contracts it holds with the transmission company and the degree to which it has decided to rely on the spot market. Since distributors would in general hold different portfolios of contracts, even utilities with identical characteristics could have different wholesale costs of power. The result could be additional variation in wholesale costs across utilities.

Nevertheless, the presence of a wholesale electricity pool would provide equitable access to reasonably priced electricity to all distributors and hence to all end-use customers. It would also act as a vehicle for pooling risks associated with uncertainties in the price and availability of electricity.

Horizontal Separation of Hydro Generation

At one extreme, and consistent with the status quo, Hydro could retain possession of all currently owned *generating* facilities. An intermediate alternative involves dividing Hydro into *separate* fuel-based or regional generating companies. At the other extreme, one can imagine further subdividing Hydro

into multiple hydraulic, fossil and nuclear companies. Competition would be enhanced if control of each company were in the hands of distinct and independent boards.

There are two key competing arguments influencing the most desirable restructuring of Ontario Hydro *generating* assets. On the one hand, one does not want to fragment generation facilities (by placing them in separate corporations), to the point where operational advantages are lost. On the other hand, a larger number of players enhances the potential for competition and improved efficiency, facilitates the introduction of non-utility generation and the introduction of new technologies, and generally moves away from central planning approaches.

Returns to scale take various forms -- they can be technological, informational and administrative. From the technological point of view, the efficient scale of a generation company is but a fraction of the approximately 30,000 MW of capacity currently owned and operated by Ontario Hydro. Indeed, by this measure, Hydro is one of the largest utilities in the world.

Furthermore, the distinctness of the nuclear, fossil and hydraulic technologies suggests that there are few technological or informational benefits from retaining the three technologies within one corporation. Indeed, Hydro's recent restructuring of generation activities into separate nuclear, fossil and hydraulic business units reinforces this argument and sets the stage for possible division into separate companies.

Further subdivision of nuclear generation, into separate companies -- e.g., at Pickering, Bruce and Darlington -- is a more complex issue. Hydro nuclear facilities share information and coordinate outages in order to optimize capability factors and outage rates. The nuclear technology also has intricate and challenging post-life-cycle issues such

as decommissioning and irradiated fuel disposal. Nevertheless, it may be possible to create a separate company at each nuclear site and it is reasonable to expect that such companies would cooperate amongst each other. Indeed, there are numerous examples in the private sector of cooperation amongst competitors particularly in areas such as research and development, safety and the environment.

Further subdivision of fossil and hydraulic facilities is much more feasible. These technologies are much simpler, more standardized and have been observed over their complete life cycles. There are likely few technological and informational returns to scale from maintaining for example, all fossil facilities within one company.

In considering horizontal de-integration, it would be desirable, though not essential, to clearly define the degree of separation up front. Furthermore, it should be kept in mind that the larger the number of players, the less the likelihood of anti-competitive or collusive strategic behaviour. (Since restructuring, the two major private sector generating companies in the U.K. have engaged in strategic behaviour requiring intervention by the regulator. Further subdivision would have ameliorated this problem.³⁰⁾

Subdividing Hydro confers a number of advantages. The first is that competition is enhanced. Even if Hydro descendants are publicly owned, the management of each company would have an incentive to see that its company thrives, that its sales do not deteriorate and even that its market share increases.

Second, subdividing Hydro would reduce potential for political interference by the government as well

³⁰ See D. Newbery "Power Markets and Market Power", *Energy Journal*, (1995) v.16, 39-66, and R. Green and D. Newbery, "Competition in the British Electricity Spot Market", *Journal of Political Economy*, (1992) v.100, 929-53..

as reducing Hydro's own political leverage. Indeed, there would be competing *political* interests among the created generating utilities.

Third, for the period during which generation is still regulated, individual generators would serve an important audit function within the regulatory process.

Fourth, subdivision would increase the transparency of costs and reduce the potential for cross-subsidization.

In short, dividing up Hydro generation into several companies creates competing interests in the economic, political and regulatory arenas, enhancing competitiveness in each.

Rationalizing Distribution

The companion paper entitled *A Proactive Process for Restructuring Distribution in Ontario* contains a detailed discussion of rationalization of distribution. Here we summarize the main results and conclusions.

At the outset, it should be noted that distribution systems vary widely throughout the world. Systems that incorporate municipal utilities are common. Germany has over 800 and is considering adding another 150. Norway has over 200 distributors, many of which are municipals. New Zealand has 47 distributors, a number of which are entering into partnerships as a result of the need to negotiate supply contracts.

In Ontario, 70% of electricity is distributed by over 300 municipal utilities. Ontario Hydro currently distributes the remaining 30% through Ontario Hydro Retail.

Distribution currently performed by Ontario Hydro should be assumed by local distributing utilities. Responsibility in remote and unorganized territories should devolve to separate, unrelated, independent, customer-governed utility commissions that will operate under the same conditions that apply to all utility commissions. This separation of distribution is part of vertical unbundling of Ontario Hydro, the necessity of which is argued extensively above.

Once distribution is separated from transmission and generation, the distribution system should undergo restructuring. Uniform utility structures (e.g., size and types and levels of service) throughout the province are neither necessary nor desirable. Nevertheless, distributing utilities should be no smaller than a municipality and as a consequence, where they have not done so, they should expand to their municipal boundaries. Nor should distributors be larger than a region, county or district in order that they be locally accountable. Distributing utilities should eventually be contiguous.

Principal drivers of the restructuring process should be:

- the requirement for distributors to fulfil new responsibilities, in particular, the obligation to serve and supply and an increased role in energy services;
- forecasting and contract negotiation responsibilities that will be undertaken by distributors;³¹
- returns to scale, i.e. the potential for cost savings through amalgamation/ cooperation with neighbouring utilities;

³¹ In New Zealand, this has been a significant force driving distributor restructuring.

- returns to scope, i.e. the potential for cost savings through consolidation of electricity distribution with water / sewage and other infrastructure services;
- the preferences, desires and values of local customers and communities;
- accountability to the customer and the local community;
- reliability and customer service.

If restructuring is implemented with these drivers in place, the reconfiguration will better serve the public interest.

In contrast, proposals to create a small number of regional monopolies are not well thought out and should be rejected. Such arrangements eliminate local accountability; they increase monopoly power of distributors with no demonstrable compensating benefits; they impair the ability of the regulatory authority to use yard-stick regulation / competition; and they would be difficult to reverse. Arguments that they would substantially improve efficiency are at best unproven and more likely specious. The British experience with twelve regional distributors provides ample evidence of the difficulties in regulating a small number of large distributors.³² Furthermore, the majority of Ontario end-use customers are already served by distributors that exceed minimum efficient scale.

Proposals by the Financial Restructuring Group and Ontario Hydro management that municipal distributors be merged into Ontario Hydro are contrary to the public interest and should be rejected unequivocally. Such a merger would be

fundamentally anti-competitive, would strengthen the monopoly power of Ontario Hydro and would require regulatory contortions to protect the consumer. Nor will merger solve Ontario Hydro's financial problems. The independence of the municipal electric utilities and the threat that they might seek supplies elsewhere strengthens the incentives for Ontario Hydro to improve efficiency and to put its financial house in order. The objective should be to maintain pressure on the generation side of the business through the municipal electric utilities and their customers. Indeed, the purpose of merger can only be to expropriate the equity which municipal utilities, through their local customers, have so carefully accumulated; and, to take over an important strategic asset -- the distribution system, in order to enhance the monopoly power of Ontario Hydro.

Energy Services

It is difficult to predict the nature of energy services that will emerge, the technologies that will become the industry standard, the degree of scope and scale efficiencies for those that deliver such services and the kinds of investments that may be required.

Nevertheless, distributors have direct contact with end-use customers, and are most familiar with their needs. As such, they should be responsible for assisting them in obtaining the energy services they need.

In the interest of the customer, the delivery of such services should not be limited to, or even dominated by distribution companies. There is an important role here for the private sector.

³² See *Distribution Price Controls: Proposals*, Office of Electricity Regulation, August 1994.

B. OWNERSHIP

Public / Private Ownership of Generation

The MEA position on ownership of generation is based on the following observations.

- Total privatization is not a necessary nor sufficient condition for improving the overall efficiency of generation and reducing wholesale rates. What is essential is that competition be increased among generators, be they public or private.
- Privately owned generators will generally require a higher rate of return on their investment than publicly owned generators and this would exert an upward pressure on rates. In addition, taxation of private generators would also tend to increase rates. Hydro financial forecasts confirm these results.³³
- Nuclear assets would be particularly difficult to privatize, as the experience in the United Kingdom confirms.
- There would be little public benefit or public support for privatization of major hydraulic facilities such as Niagara Falls. These are generally viewed as 'heritage resources' that should continue to benefit future generations.³⁴
- Privatization would not significantly contribute to reduction of Ontario Provincial debt. Ontario Hydro projects that proceed to the provincial treasury

³³ See the report of the Financial Restructuring Group *Ontario Hydro and the Electric Power Industry* and the Ontario Hydro management report *Competition, Convergence and Customer Choice*, Ontario Hydro, Sept. 30, 1995.

³⁴ New Zealand has found it politically difficult to privatize its hydraulic resources, and for the time being has abandoned this course.

would be less than \$1 B,³⁵ a tiny proportion of the \$100 B of outstanding direct provincial debt.

- Privatization and defeasance of provincially guaranteed Ontario Hydro debt would remove a large contingent liability from the Province's balance sheet. However, Ontarians would continue to service the debt through electricity rates as they always have. It is unlikely that Ontario's credit rating would be substantially affected.
- Even if nuclear assets could be privatized, it is extremely unlikely that the private sector would be willing to assume liabilities and risks associated with future decommissioning costs and irradiated fuel disposal costs. The public sector would be the ultimate bearer of this risk. Thus, the oft-raised argument that privatization transfers capital risk to the private sector would, at best, be realized only partially.³⁶
- Partial privatization, through share ownership, is an option worthy of consideration. Furthermore, advance testing of the market, through the sale of a limited number of futures, would reduce the likelihood that assets will be sold below market value as they have been in many other jurisdictions. Finally, in order to encourage competition and reduce the ill effects of market power, it is best to create a larger number of small companies rather than a few large ones.³⁷ In any event, no portion of

³⁵ See the report of the Financial Restructuring Group *Ontario Hydro and the Electric Power Industry*. The Ontario Hydro management report *Competition, Convergence and Customer Choice*, Ontario Hydro, Sept. 30, 1995, does not examine value of proceeds upon sale but finds that a private equity infusion which lowers the debt ratio to 70% would dramatically increase electricity rates.

³⁶ Again, the U.K. experience is relevant where a substantial portion of nuclear risk would remain in the public sector even if nuclear assets were privatized.

³⁷ For both of these points, see M. Beesley and S. Littlechild "Privatization: Principles, Problems, and Priorities", *Lloyds Bank Review*, July 1983.

Hydro assets should be privatized unless it can be clearly demonstrated that such an action will reduce the cost of electricity in the short run and in the long run.

■ As we have stressed earlier, no form of privatization should be undertaken prior to separation of Hydro into separate generation, transmission, and distribution companies. The creation of private property rights would greatly complicate and indeed impede any future restructuring process, both from a legal and a political standpoint.

In summary, there appears to be little benefit to the people of Ontario from significant privatization of Hydro assets at this time. The reasoning underlying this position is best encapsulated as follows: Hydro's strongest assets (hydraulic facilities and the transmission system) *should not* be privatized, and those that are currently the most debt-laden (nuclear assets) *cannot* be privatized.

Finally, even if privatization does not take place, one can expect that the industry will, in time, be subject to the discipline of a market where private ownership and interests are an important driving force. Once current excess capacity is absorbed, future supply should be financed by private capital in order to strengthen market forces.

Public Ownership of Transmission

Transmission is a natural monopoly and there is no apparent benefit from transferring ownership to the private sector.

A private transmission company would require vigilant regulation in order to protect against monopoly profits and to ensure fair access to the transmission grid. Private ownership would also

increase costs through higher costs of capital and taxes.

Finally, an important benefit of public ownership that must be stressed is that it substantially reduces the risk of vertical re-integration of the industry as is now occurring in the U.K.

Local Ownership of Distribution

Distribution is also a natural monopoly, but in this case the geographic dimensions over which a system achieves efficient scale, are much smaller than for a transmission grid. Thus, local ownership is not only feasible but more likely to ensure responsiveness to local needs.

On the other hand, private ownership of distribution would, if the U.K. experience is at all indicative, lead to excessive profits.

C. REGULATION

The 'Electricity Regulator'

There is no debate about one regulatory matter. The presence of competitive pressures must not be permitted to compromise nuclear safety in any way. The regulatory process controlling safety should maintain complete autonomy.

However, in order that restructuring take place smoothly with a minimum of political interference, it is essential that a provincial 'electricity regulator' be appointed. The position should be at arm's-length from the government and the office should have the power to enforce decisions.

The regulator should be charged with:

- ensuring a smooth transition to greater competition in generation without the creation of stranded assets;
- regulation of wholesale costs and rates during the transition period;
- ongoing regulation of transmission company costs and capital plans.

It would also be desirable for the regulator to be responsible for environmental matters.

Deregulating Generation

While there is excess capacity, it will be necessary to restrict entry into the generation side of the business. The regulator would be responsible for ensuring that uneconomic bypass is minimized.

Once the excess capacity is absorbed, the transmission company will be in a position to acquire supply from the least cost suppliers without interference from the regulator.

Fortunately, the generation portion of the industry which can be deregulated also represents the largest (70%) share of costs. Thus, considerable gains can be realized through competition.

Provincial Regulation of Transmission

Transmission will require continued regulation. Given the integral nature of the system, it would best be regulated by a single entity. Informational considerations most strongly favour concentration of responsibilities for regulation of costs, capital plans and environmental aspects within one regulatory authority. Fragmentation of these responsibilities, as has been the case in the regulation of Ontario Hydro, would not serve the public interest.

Once competition in generation has been implemented, there will be new issues for the regulator to deal with. In particular, the location of future generation facilities will have implications for transmission system operation and expansion. Thus, appropriate mechanisms will need to be put in place to ensure that both generation and transmission investment decisions are coordinated and made in an optimal fashion.

Local Regulation of Distribution

Regulation of distributors poses potentially conflicting objectives. The benefits of local accountability suggest that regulatory authority should reside at the local level.

However, there is a fundamental question whether municipal authorities could effectively fulfil this regulatory responsibility in view of the substantial information that would be required to properly assess costs.

The issue can be resolved by carefully distinguishing informational issues from control issues. The essential *tool* that the local regulator would require is a sound basis for assessing the costs incurred by the utility. Given the large number of distribution utilities present in the province, such can be provided so long as costs are transparent and accounting methods are uniform across utilities. Where a public utility commission provides multiple services, costs should be segregated and allocated as far as possible.³⁸

Given this tool, the local commission or other regulatory body would be in a position to exercise the *control* that is required. In some instances,

³⁸ A small number of utilities have modest quantities of own generation. Such generation, since it poses no threat to the development of competition, would remain with the distributor.

communities which collectively desire distribution services above the basic level, may choose, through their commission, to pay the higher costs associated with them.

In summary, regulatory control through the local commission, will ensure accountability and responsiveness to the end-use customer. Yardstick cost and performance measures should be further developed³⁹ for distributing utilities to assist local

commissions in their regulatory role. A mechanism for setting guidelines and standards will need to be established in order to ensure uniformity of accounting methods and transparency of costs.

³⁹ Municipal utilities in Ontario, through the MEA, currently accumulate a number of performance measures on a regular basis. These are used for the purpose of establishing comparative performance.

IMPLEMENTATION TIMETABLE

	PHASE I 1997	TRANSITION 1998 - 1999	PHASE II 2000
GENERATION	separate generating company established;	horizontal de-integration considered; generating company reduces debt to prepare for competition; privatization considered	full competition in generation supply; contracts with transmission company commence;
TRANSMISSION	separate transmission company established; assumes obligation to supply;	transmission company meets demand using Ontario Hydro generation and existing NUG contracts;	transmission company purchases from least-cost generators;
DISTRIBUTION	separate distribution companies to serve present Ontario Hydro Retail customers are established;	restructuring of distribution utilities;	distributors have obligation to supply; contracts with transmission company commence;
REGULATION	Provincial regulator appointed to oversee transition;	regulator controls entry to generation market to prevent uneconomic bypass;	regulation of generation ceases;

D. IMPLEMENTATION

Timing / Urgency

The present excess supply of generating capacity in Ontario is the main factor affecting timing. Unbridled competition cannot be introduced immediately otherwise uneconomic by-pass will occur, leading to stranded assets.

Relatively low electricity rates in Ontario reduce the urgency for restructuring. The main exception consists of the few electricity intensive large industrial users who are coming under intense

pressures from competitors receiving special rates in other jurisdictions.⁴⁰

Although there is ample time to implement restructuring changes in Ontario, certain actions must be undertaken immediately in order to provide Ontarians with the best electricity future. Most important among these is vertical unbundling and the appointment of a regulator to oversee restructuring.

⁴⁰ In contrast, California, where ambitious restructuring changes are being undertaken, has rates that in some locations are more than twice those in Ontario.

A prudent approach would divide implementation into two phases. An interim or transitional phase beginning January 1, 1997, with full competition in generation supply to begin on January 1, 2000.

Phase I: January 1, 1997

On January 1, 1997 the following elements would be implemented:

- a separate publicly owned transmission company would come into being; the obligation to procure adequate supply to meet provincial needs would transfer to the transmission company;
- a separate generating company consisting of Ontario Hydro's hydraulic, fossil and nuclear businesses would come into being;
- a separate distribution company servicing Ontario Hydro's current retail customers would come into being;
- a separate company consisting of OHII and OHT would come into being;
- a provincial regulator would begin serving an initial three-year term to oversee the transition period.

In order that these changes can be implemented, division of assets, liabilities and equity would need to be determined during 1996. It is expected that the transmission and distribution companies could be established with higher debt ratios than the generating company.

Furthermore, the government would need to pass enabling legislation. In this regard, it is essential that no legislation be passed which would increase Ontario Hydro's unilateral ability to engage in anti-

competitive practices such as predatory pricing and cross-subsidization.

Transition Period

During the transition period, the following changes would take place:

- the generating company would reduce its debt in preparation for full competition;
- the distribution segment of the industry would undergo restructuring and prepare to meet its forthcoming obligations;
- horizontal de-integration of the generation company would be considered; possibilities for privatization of portions of generation, OHII and OHT would be considered.

Phase II: January 1, 2000

On January 1, 2000 the remaining elements would be implemented:

- the obligation to procure adequate supply would transfer to the distribution companies;
- contracts for supply between distributors and the transmission company, and the transmission company and suppliers would commence;
- full competition in generation supply would commence; the transmission company would be free to purchase from least-cost suppliers.

Other Ontario Hydro Operations -- OHII, OHT

The activities of OHII and OHT should not be funded using rate-payer funds. Instead, these entities should be entirely separated from Ontario Hydro and should seek funding in private capital markets.

Indeed at hearings into OHII and OHT activities, the Ontario Energy Board made the following observations.

"The Board is concerned that these activities involve ratepayers making involuntary and speculative investments...The possibility that there may be gains or equity enhancement in successful projects merely illustrates the speculative nature of these involuntary investments by Hydro's ratepayers." (*Report of the Board*, HR22, 1995).

E. IMPACTS

Reliability, Quality and Security of Supply

Under the proposed model, distributors will have the obligation to serve and to secure adequate supply. Distributors will continue to be accountable to their local commissions which will continue to assure reliability.

In Ontario, the majority of municipal utility commissions are elected, the remainder are appointed by municipal authorities. This form of direct political accountability will assure that reliability and quality of service is maintained and that adequate supplies have been secured.

In addition to the leverage exercised through direct accountability, there is a sound statistical basis for expecting that reliability will not deteriorate. Though the results are unadjusted for factors such as customer density, results contained in a recent Canadian Electrical Association study indicate that municipal distribution utilities provide service that is at least as reliable as a comparison group which

consists principally of vertically integrated Canadian utilities.⁴¹

Evidence from the U.S. also confirms the reliability of municipal utilities. Large U.S. municipals have for years procured their own supplies. Many smaller utilities are members of Joint Action Agencies which negotiate bulk power contracts or build generation facilities on behalf of their members. Continued efforts at 'municipalization', (the act of establishing a municipal electric utility) by a number of U.S. communities underscores the common perception that they can provide reliable service at better rates.⁴²

Stranded Assets / Costs

Assuming no major reverses in nuclear operations and modest growth in electricity demand, (the descendants of) Ontario Hydro will be able to reduce debt by about \$8 billion by the year 2000. The debt ratio should approach 70%, and the risks of stranding investment should be low as projected by Ontario Hydro. Indeed, an independent study has confirmed that even now Ontario Hydro is the low cost producer of electricity in the region and should be well positioned to compete in the near future. (The comparison group consisted of 32 utilities in the northeastern U.S. market area and excluded Quebec.)⁴³

If in the year 2000, the regulator finds that competition in generation could lead to uneconomic bypass and asset stranding at publicly-owned entities,

⁴¹ 1993 Annual Service Continuity Report on Distribution System Performance in Canadian Utilities, Canadian Electrical Association, May 1994, p.46.

⁴² See *Public Power Weekly*, no. 95-46, November 13, 1995.

⁴³ *Competition, Convergence and Customer Choice*, Ontario Hydro, Sept. 30, 1995, p.12,26,28, 31. The independent study was performed by Resource Data International.

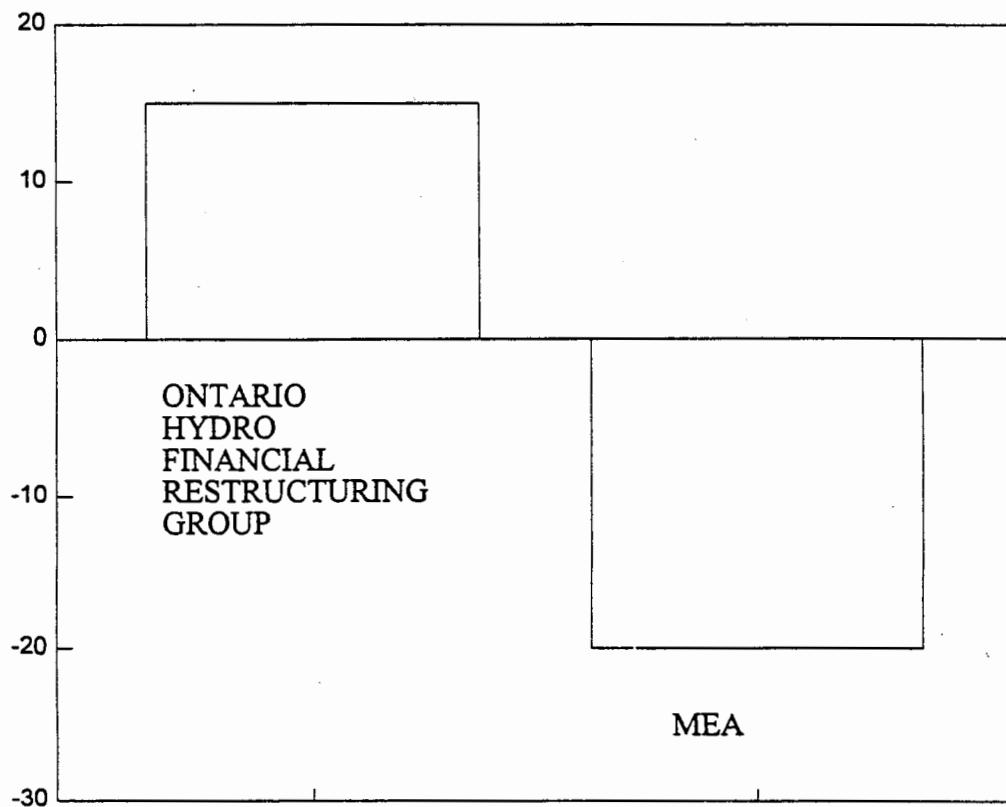
(s)he could transfer debt from the generation side of the industry to the transmission company. These additional costs could then be recovered through transmission rates.

Efficiency Gains in Distribution

The recent joint MEA / Ontario Hydro study of distribution in Ontario, performed by the Coopers and Lybrand Consulting Group, tentatively identified \$75 million in annual cost savings at the distribution level which could be realized through moving to 'best practices'.

Early in the transition period, municipal utilities will complete cost analyses by undertaking local and detailed studies to determine the potential for efficiency improvements and cost savings through scale economies, scope economies and productivity improvements. These will be examined in the context of the new role of distributors in the electricity system.

Figure 9: Real Rate Impacts of Alternative Proposals



By the end of the transition period, it is expected that substantial savings will be realized as a result of:

- Scale efficiencies -- in some cases, utilities will merge operations with neighbours or will enter into cooperative ventures.
- Scope efficiencies -- some utilities will combine operations with other municipal utility services such as water, sewage, gas or other infrastructure services.
- Productive efficiencies -- yardstick competition based on the large available cost data base will drive cost savings and productivity improvements.
- Technological change -- further efficiency gains can be expected through the implementation of improved technology.

Rate Impacts

Under the status quo, Ontario Hydro projects that bulk power rates would decline 16% in *real* terms by the year 2004. The single largest risk to the forecast is nuclear performance.⁴⁴

Under the MEA proposal, there is continuous downward pressure on rates from competition in generation and yardstick competition in distribution. Note that even the expectation of forthcoming

⁴⁴ Projections assume nuclear capability of 75% over this period. While lifetime performance of Ontario Hydro nuclear reactors has been good by world standards, there have also been major losses. In particular, one of Hydro's 20 nuclear units has been moth-balled less than half-way through its originally projected lifetime. It is unlikely to see service again. Furthermore, aging of nuclear plants will put upward pressure on such costs.

OM&A costs at U.K. nuclear plants (which remain in the public sector) declined dramatically following industry restructuring and privatization. However, Ontario Hydro current expenditures in this area are about 25% lower than those reviewed by the Ontario Nuclear Cost Inquiry and about 50% of the U.S. industry average.

competition should further reduce costs during the transition period. (This effect would be reinforced if Ontario Hydro generation is divided into a number of small companies. They would then strive to reduce costs in order to position themselves for the opening of competition in the year 2000.) Thus, under the same assumptions, one would expect the MEA plan would result in rate reductions *exceeding* 16% in real terms by 2004.

Privatization scenarios lead to rate *increases* as a result of higher cost of capital and tax payments. With an \$8 billion private equity injection (which would reduce the debt ratio to about 70%), Ontario Hydro projects nominal rate *increases* of 26%-32% by the year 2004. Forecasts of rate impacts under the privatization scenario prepared by the Financial Restructuring Group at Ontario Hydro also indicate increases in rates⁴⁵ (see Figure 9).

Models involving retail access could have different rate impacts for distinct customer groups. In particular, there is a risk that large customers will benefit at the expense of 'captive' residential, commercial and small industrial customers. Access also creates greater risk of uneconomic bypass and stranded assets which would put upward pressure on rates.

The variant of convergence models, proposed by Ontario Hydro also has serious rate risks. If Ontario Hydro begins investing in telecom, (it is currently requesting the flexibility to use its rights-of-way for such purposes), under current arrangements ratepayers would not be protected from failed

⁴⁵ See the report of the Financial Restructuring Group *Ontario Hydro and the Electric Power Industry* and the Ontario Hydro management report *Competition, Convergence and Customer Choice*, Ontario Hydro, September 1995.

Although privatization and defeasance of provincially guaranteed Ontario Hydro debt would remove a large contingent liability from the Province's balance sheet, Ontarians would continue to service the debt through electricity rates as they always have. (In this connection, it is worth noting that the provincial guarantee has never been called upon and ratepayers currently pay a 'debt guarantee fee' to the province.)

Finally, a decision by the Province to impose additional taxes on the electricity industry could contribute to deficit/debt reduction. (Increasing electricity prices would probably not be efficient at this time given the excess capacity on the system.) Such government initiatives require neither privatization nor restructuring to implement.

Sustainable Development

Avoiding the creation of stranded assets, upon which the MEA proposal focuses considerable attention, also has environmental benefits. A significant portion of environmental costs must be incurred whether or not the facility continues to be used. This is true, for example, of nuclear assets. Thus, the cessation of use of nuclear facilities would not eliminate the environmental costs and risks associated with decommissioning and irradiated fuel disposal.

The presence of a single purchasing agent, as in the MEA model, also facilitates the implementation of environmental policies in a systematic fashion.

F. OTHER PROPOSALS

Overview

Various parties have advanced proposals for restructuring the electricity industry. The chart

("Alternative Restructuring Proposals") summarizes the salient features of specific models that have been proposed by the MEA, Ontario Hydro Management, the Ontario Hydro Financial Restructuring Group, the Association of Major Power Consumers of Ontario (AMPCO) and the Independent Power Producers Society of Ontario (IPPSO). The chart organizes key features according to the three categories -- structure, ownership and regulation.

Other parties -- the Power Workers' Union of Ontario Hydro, Ontario Hydro Professional and Administrative Employees (the Society), the Ontario Natural Gas Association, Toronto Dominion Securities Inc. and RBC Dominion Securities -- have also provided commentaries.

Previous sections of the current paper as well as the companion papers, set out the central criticisms of proposals such as vertical merger of the industry, privatization of natural monopoly components and retail access. Thus, the areas of agreement and disagreement between the MEA model and other models have already largely been mapped out and identified. In the following, we provide further comments on the specific proposals being put forth.

Before we turn to these, we note that of the models that are proposed, the two put forth by Ontario Hydro, and the AMPCO proposal, do not recommend initial creation of a *separate* transmission company. Ontario Hydro Management advances a holding company structure (for possible subsequent re-integration), while the Financial Restructuring Group and AMPCO propose initial merger of the municipal utilities into Ontario Hydro with unbundling to occur at an unspecified point in the future.

Proposals such as these, which would maintain or strengthen Ontario Hydro monopoly power, do nothing to overcome the most fundamental of the

investments.⁴⁶ Furthermore, because of the lack of transparency and the difficulty in separating costs, there is a risk of cross-subsidization from the electricity side of the business to the telecom side.

Competition and Subsidies

The continued presence of the obligation to serve will ensure that all areas, even those that are less economically advantaged, will be served.

The decision to continue the Rural Rate Subsidy is a public policy matter which should be resolved by the government. Continuance of rural rate assistance appears to have broad support, even amongst urban customers of municipal utilities.

Clear rules should be established for the provision of subsidies or other means of sustaining uneconomic services. Furthermore, financing mechanisms should also be clearly specified. Under the model proposed by the MEA, a natural approach would be to incorporate such costs into transmission charges.

Economic Competitiveness and Regional Economic Impacts

The MEA model enhances economic competitiveness through maximum rate reduction while maintaining rate stability.

Vertical unbundling and the creation of multiple generators in a domestic competitive setting maximizes the potential that these companies will be able to insert themselves successfully into U.S. markets when the opportunity arises.

Competition in generation will also assure low domestic prices which is the best protection against

⁴⁶ Nor are they protected from investments that Hydro has already made in foreign utilities through OHII.

foreign competition while preserving the interests of the consumer.

The presence of cost pooling in the MEA model protects against large regional rate disparities. Prudent and accountable acquisition of supply contracts by distributors should prevent dramatic increases to current regional differences in rates and indeed such differences could even decrease.

Reduction of Public Debt and Liabilities

Privatization of the electricity system cannot bring about a substantial reduction of public debt. The electricity system, in particular Ontario Hydro, is too highly leveraged.

Estimates by the Financial Restructuring Group indicate that, even after expropriation of municipal utilities, the creation of several competing privatized generators in Ontario would produce less than \$1 billion of excess cash to be distributed to the province and to municipalities, a lamentably tiny amount for the privatization of all generation assets (including such heritage assets as Niagara Falls).⁴⁷ Proceeds of this size will contribute little to the reduction of accumulated provincial debt of about \$100 billion.

Nor would privatization transfer nuclear risks to the private sector which would certainly seek to limit such liabilities. As the U.K. experience underscores, the government and public will ultimately be responsible for certain major long term risks such as those associated with irradiated fuel disposal and excess decommissioning costs.

⁴⁷ *Ontario Hydro and the Electric Power Industry*, June 22, 1995, p.35. Even privatization of generation as a *monopoly* with the attendant consequences for ratepayers, would yield only \$3 billion according to this study.

ALTERNATIVE RESTRUCTURING PROPOSALS

	STRUCTURE				OWNERSHIP	REGULATION
	Generation	Transmission	Distribution	Competition		
MEA	Multiple competing nuclear, fossil, hydraulic companies.	Separate public company.	Locally controlled, publicly owned distributors.	Competition in generation to supply wholesale pool.	Public sector transmission and distribution. Privatized generators if beneficial.	Immediately establish electricity regulator to oversee transition.
Ontario Hydro Management	Separated within Ontario Hydro. ¹	Separated within Ontario Hydro.	'Bottom up' economic drivers promote retail restructuring.	Two track approach.	Open to privatization.	Incentive regulation for distribution and transmission, IRP for new generation.
Ontario Hydro Financial Restructuring Group	Ontario Hydro becomes completely vertically integrated by taking over all distribution. ²			No retail access for foreseeable future (with possible exception of large industrials).	All generation privatized immediately. Possible privatization of transmission and distribution.	Rate of return regulation for transmission, incentive regulation for distributors and single generator.
AMPCO	Initial merger of meu's into Ontario Hydro and holding company structure. Subsequent creation of five separate competing generating companies.	Separate transmission company.	Creation of 20 large distribution companies.	Retail access; purchase through brokers, direct bilateral contracts and distribution companies	Eventually privatize all sectors, except where there is need for government involvement.	Performance regulation for "wires" business, i.e., transmission, distribution.
IPPSO	Separate competing generating companies. Set aside 20% of new required capacity for renewable generation.	Separate company, possibly Crown agency.	Local distribution companies.	Competing generation to supply wholesale pool. Wholesale contracts for differences.	Open to privatization.	Immediately establish binding regulator to guide transition and regulate transmission rates, and retail access.

SOURCES: MEA: this report. Ontario Hydro Management: *Competition, Convergence and Customer Choice*, September, 1995. Ontario Hydro Financial Restructuring Group: *Ontario Hydro and the Electric Power Industry*, June 1995. AMPCO: *AMPCO Position on Electricity Market Restructuring*, July 1995. *Financial Impact of AMPCO's Ontario Hydro Restructuring Proposal*, November, 1995. IPPSO: *Clean, Competitive and Customer-Driven Power: The Case for Retooling Ontario's Electric Power System for the 21st Century*, Financial and technical supplement to IPPSO FACTO. November 1995. ONGA: *Serving Ontario's Energy Consumers Better*, September 1995.

¹ Holding company structure with generation, transmission and distribution subsidiaries. Large "wires" companies. Convergence with other industries.

² Absorption of municipal utilities into Ontario Hydro to gain meu equity and distribution network. Subsequent vertical separation. Preference for single private generating company, possibly up to 5 generators. Up to 10 large distributing companies.

'Barriers to Change', (see section II B above) -- i.e., Ontario Hydro's monopoly power itself.

Indeed, there is a serious risk that the creation of a stronger monopoly will alter the subsequent path of evolution and restructuring in the industry. Monopolies, public or private, are capable of exerting considerable economic and political leverage and have significant advantages in regulatory settings (due to asymmetry of information). Stronger monopolies have greater leverage.

Ontario Hydro Management: Competition, Convergence and Customer Choice

The Ontario Hydro Management report takes as its departure point the proposition that retail access is inevitable. The report also relies heavily on vaguely specified notions of convergence.

As we have argued in earlier sections, the institutional and regulatory structure of the industry has been driven to a very large extent by technological and economic factors.⁴⁸ Changes in the economics and technology of generation that have already taken place, dictate vertical separation of the industry.

Institutional changes premised upon the inevitability of retail access and convergence are based upon technological innovations which may or may not take place.

Good public policy would restructure the industry based on technological and economic realities, *without foreclosing future options*. Vertical separation does exactly this.

⁴⁸ See also R. Hirsh, "Regulation and Technology in the Electric Utility Industry: An Historical Analysis of Interdependence and Change", in J. High, ed., *Regulation: Economic Theory and History*, University of Michigan Press, 1991.

Other features and arguments contained in the Ontario Hydro Management report include:

- **Financial Forecasts:** Under the status quo, the report projects 16% reduction in real electricity rates by 2004 and a reduction of the debt ratio from the current 91% to 57%. Under a scenario where there is a private equity infusion of \$8 B, the debt ratio declines to 70% but nominal electricity rates increase by over 30%.
- **Continued Vertically Integrated Structure:** Ontario Hydro convergence scenarios do not propose full and complete separation of transmission and distribution from generation. Thus, monopoly power remains within Ontario Hydro.
- **Economic Drivers Promote Retail Rationalization:** the report relies upon a 'bottom up' approach to promoting retail rationalization. Economic drivers, while not specified in detail, are given as the impetus behind restructuring. (This approach is in sharp contrast to that of the Financial Restructuring Group which would simply expropriate municipal utility assets.)

Ontario Hydro Financial Restructuring Group

The report entitled *Ontario Hydro and the Electric Power Industry: Vision for a Competitive Industry; Helping Ontario to Thrive to and Beyond 2000* was prepared by external members of Ontario Hydro's Financial Restructuring Group: W.A. Farlinger, G.J. Homer and B.S. Caine.

Its central features are merger of municipal electric utilities with Ontario Hydro, and privatization. Retail access may not occur until 2010.

Three arguments are adduced for merger of municipal utilities with Ontario Hydro: inefficiency

of municipal utilities, the risk of defection and improved potential for privatization.

The report suggests that there are substantial savings in the distribution system, citing numbers ranging from \$62 million to \$500 million. (No analysis is provided to support the contention.) The report also points to Hydro Mississauga's 8% gross margin and argues that this is achievable throughout the system. The conclusion is erroneous -- the low gross margin at Mississauga is due, in part, to a long term capital contribution policy.

The risk of defection to which the report refers, is actually not a risk but a benefit to Ontario rate-payers since it is exactly this kind of pressure that has caused Ontario Hydro to cut costs during the last several years.

Evidently, the purpose of the proposed take-over of municipal utility equity is to improve Ontario Hydro's balance sheet and thus make privatization more feasible. It also prevents defection, thus reducing competitive pressure on Hydro, and gives Hydro access to strategic assets.

The financial forecasts that are contained in the paper are presented without supporting details. Two privatization scenarios are proposed. Both assume expropriation of municipal utility assets, privatization of all generation including hydraulic assets and additional OM&A cuts of 15%-20%. The first scenario involves the creation of a single private generating company. Total proceeds to the province and municipalities are about \$3B. The second scenario involves the creation of 3 to 5 competing generators. With market power substantially attenuated, proceeds are lower -- less than \$1B would be available for the province and municipalities.

The report also calculates the benefit to future governments from taxation income to be \$4B-\$6B.

Although the MEA does not support taxation of electricity, it notes that neither privatization nor restructuring is necessary for the imposition of taxes.

Association of Major Power Consumers of Ontario

Restructuring proposals of the Association of Major Power Consumers (AMPCO) are contained in two documents: *AMPCO Position on Electricity Market Restructuring*, July 1995 and *Financial Impact of AMPCO's Ontario Hydro Restructuring Proposal*, November, 1995.

Like Ontario Hydro, AMPCO proposes merger of municipal utilities into Ontario Hydro. Restructuring and privatization is to take place subsequently.

The report also proposes retail access for all customers. End-use customers would have the option of purchasing directly from generators through bilateral contracts, from aggregators, from an Electricity Exchange selling at average pool prices or from a spot market. The report does not explain why preparing for retail access requires a merger of the municipal utilities with Ontario Hydro.

The report recognizes that hydraulic facilities, although highly marketable, are considered a provincial resource and that the province may need to retain a controlling interest to ensure an ongoing public presence. It also notes that privatization of nuclear assets is likely to be difficult.

The report recommends the creation of at least 5 competing companies in order that competition be effective, with no one company having a dominant market share. The AMPCO analysis does not pay adequate attention to the risk of stranded assets and their consequences for customers.

Independent Power Producers' Society of Ontario

The Independent Power Producers' Society of Ontario (IPPSO) issued a draft position paper on restructuring the electricity industry in Ontario at their annual conference in December 1995. The paper, entitled *Clean, Competitive and Customer-Driven Power* advances what IPPSO sees as a clear consensus on three issues:

- transmission is a natural monopoly;
- changes at the generation level will lead to the most rapid realization of benefits;
- any change requires empowerment of an efficient regulator with a mandate to properly implement and enforce restructuring.

IPPSO recommends that a separate transmission company, possibly a Crown agency, be formed to deliver contracted power between generators and buyers. A public provincial power pool entity would buy under a variety of contract options in a competitive marketplace, and would sell power to electricity consumers under a cost based, postage stamp rate structure. Several generation companies would be formed from the existing generation assets to ensure competition. At the local level, IPPSO proposes a prohibition on vertical integration with the exception of existing utility owned generation, and local utility projects that demonstrate societal efficiencies.

IPPSO notes that implementation of retail access through bilateral contracting would lead to significant inequities, among which are regional disparities in rates.

IPPSO endorses the creation of a retail market equal to 10% of the annual volume of Ontario's energy

sales market. This market would operate in parallel to the power pool. IPPSO notes that proceeding in this manner will harness the major benefits of competition in generation while managing a transition to a more open system at the retail level. In addition, IPPSO believes that a set aside should be built into the competitive generation market -- 20% of all new generation production should be from renewable generation technologies.

The IPPSO proposal has many similarities with the MEA proposal. The primary difference is allowance for 10% retail access. The MEA believes that the retail access that is permitted will primarily benefit large industrial companies at the expense of the other customers.

V. CONCLUSIONS

The title of this document is *Generating Competition: Equity, Reliability and Lowest Price*. ‘*Generating Competition*’ refers both to the imperative of introducing competition into the electricity industry and to the fact that it should be at the generation and wholesale level.

The MEA proposal preserves *Equity* in a number of ways. First, the presence of a wholesale power pool provides equitable access to reasonably priced electricity to all customers. Second, counselling against the privatization of major hydraulic assets, (such as the facilities at Niagara Falls), ensures that future generations are treated fairly, and that they too reap the benefits of our common heritage. Third, advising against retail access ensures that all customers, not just large industrials, benefit from the advent of competition.

Reliability is ensured because of accountability to local commissions and because the obligation to serve and supply is retained, but now at the distribution level.

Lowest Price is assured as well. Direct competition in the generation segment and yardstick regulation / competition in the distribution segment maximizes pressure on costs and rates while protecting rate payers from the costs of stranded assets.



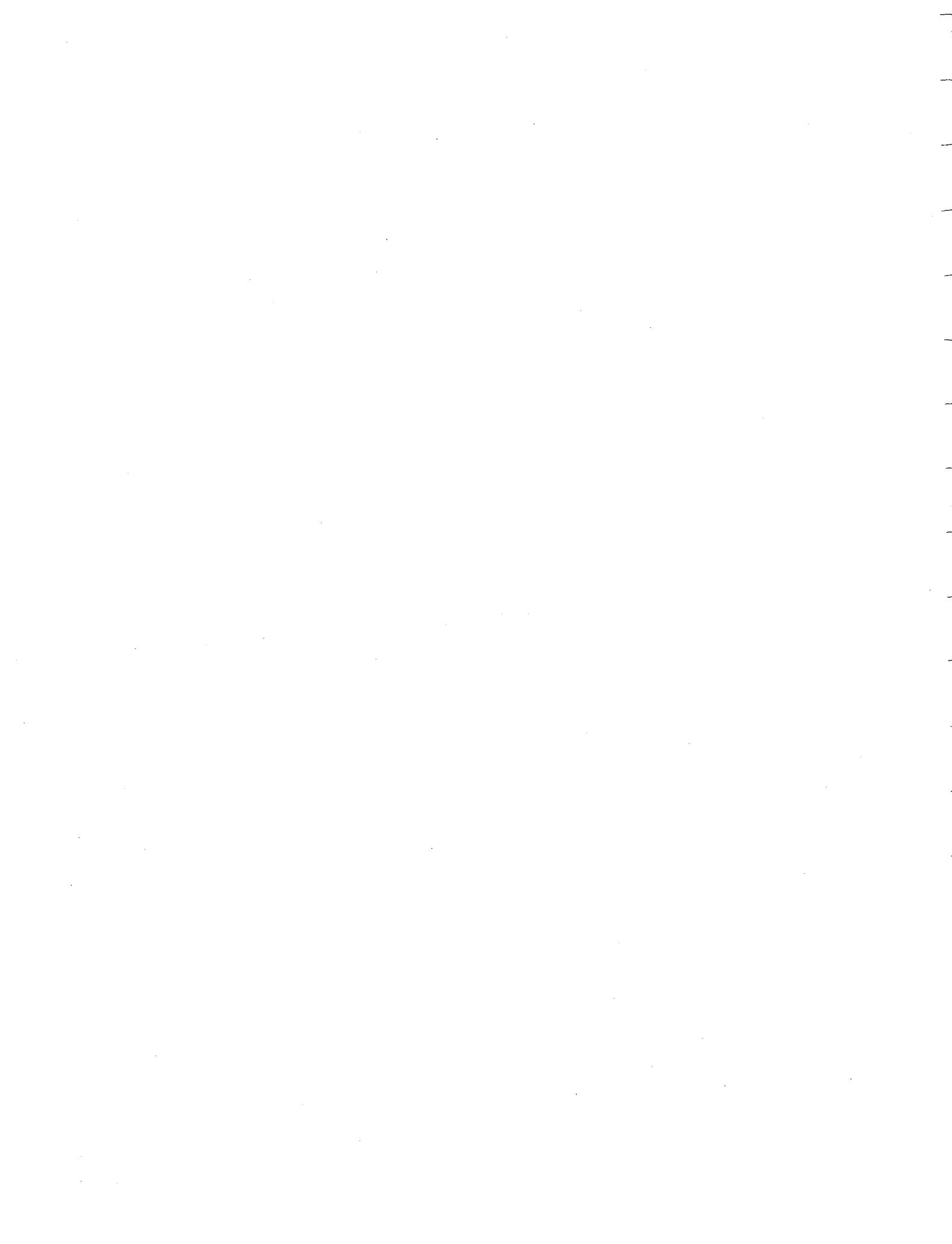
**RESTRUCTURING
DISTRIBUTION**



Municipal **Electric** Association

**A PROACTIVE PROCESS FOR RESTRUCTURING
DISTRIBUTION IN ONTARIO**

Submission to the
**ADVISORY COMMITTEE ON COMPETITION
IN
ONTARIO'S ELECTRICITY SYSTEM**



A PROACTIVE PROCESS FOR RESTRUCTURING DISTRIBUTION IN ONTARIO

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I. INTRODUCTION

Purpose

The purpose of this study is to assess restructuring of the distribution sector in the Ontario electricity industry. Our fundamental criterion for restructuring is ultimate benefit to the consumer as measured by price, reliability, quality of service and accountability.

At the outset it is essential to recognize that restructuring of Ontario Hydro and restructuring of the distribution sector represent fundamentally *asymmetric* sets of issues. The former requires breaking up an extremely powerful monopolistic agency -- which must be undertaken from the outside, since monopolies are typically resistant to loss of market power. Breaking up such monopolies can only benefit the consumer.

On the other hand, restructuring of the distribution sector does not involve problems endemic to a large, vertically integrated monopoly. In fact, the distribution sector in Ontario is highly decentralized with a large number of locally owned and locally accountable distributing utilities of varying size across the province. We will argue that such changes as are necessary will happen *so long as the right incentives and drivers have been put in place*. The most important among these will be: the obligation to supply, the requirement to expand to municipal boundaries and to undertake delivery to less populous areas, and the need to participate in the delivery of an ever broader range of energy services.

The distribution of electricity comprises about 15% of the retail cost of electricity, a relatively small proportion of which is related to retail supply

(transmission corresponds to another 15% and generation the remaining 70%)¹ (see Figure 1).

Over the years, municipal utilities have operated under conservative accounting and cost recovery policies which have resulted in relatively debt-free status. This, combined with the enormous strategic value of the distribution network, makes distributing utilities an attractive target for takeover.

Distributing Utility Systems In Other Jurisdictions²

Distributing utility systems vary widely around the world. In many jurisdictions, a network of municipal utilities forms an essential and integral part of the electricity delivery system.

Germany has over 800 municipal utilities, many of which own equity in generating companies. In addition, there are 56 regional utilities which serve less densely populated (rural) areas and 9 large, vertically integrated utilities. The latter produce 2/3 of the electricity generated. What was once East Germany, is undergoing municipalization with potentially an additional 150 municipal utilities -- many of them quite small -- being carved out of the monolithic, vertically integrated utility that formerly

¹ In the U.K., generation accounts for about 65% of costs, transmission for 10%, distribution for 22% and retail supply for 3%, "Problems of Yardstick Regulation in Electricity Distribution", T. Weyman-Jones, in *The Regulatory Challenge*, M.Bishop, J.Kay and C.Mayer, eds., p424. (See Figure 2)

² For more details on restructuring in Norway, New Zealand, the United Kingdom, the U.S. and certain other jurisdictions, see the appendix entitled Developments in Other Jurisdictions.

Figure 1: Electricity Cost Breakdown

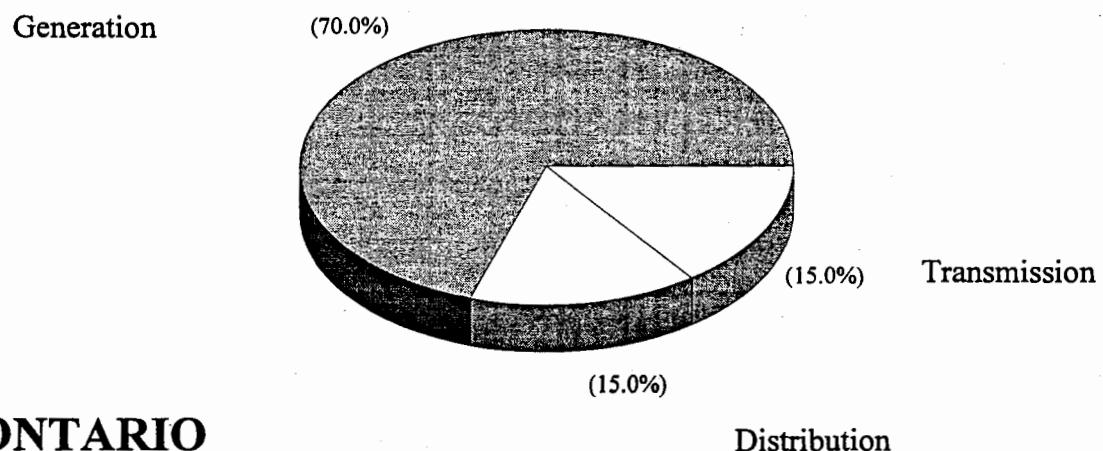
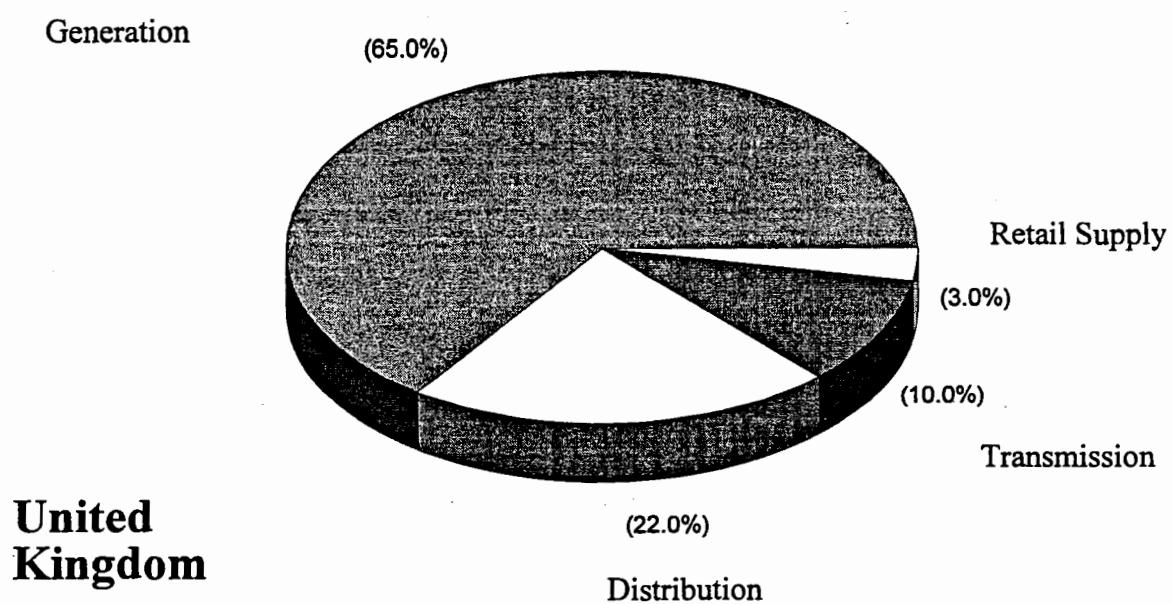


Figure 2: Electricity Cost Breakdown



served most customers.³ Though there is great variation in the size of municipal utilities, on average each delivers less than 200 GWh of electricity per year. (The 'average' municipal utility in Ontario delivers over 300 GWh.)

Norway too has an extensive and variegated distribution system with some 240 distribution companies serving a population of approximately 4 million. (Ontario has over 300 distributors but more than twice the population and a larger geographic spread.) Distributors are publicly owned and locally controlled. Some distributors are vertically integrated but the majority purchase electricity through long term contracts.

In order to isolate distribution costs, a Norwegian study⁴ focused on a sample of about 100 Norwegian companies engaging only in distribution. The average number of customers was about 11,500 with the largest serving over 290,000 and the smallest serving 655. The study found significant returns to increasing the *density* of customers within a fixed distribution area but little in the way of returns to scale. They estimated optimal distributor size to be about 20,000 customers. However, distributors serving 5,000 customers exhibited only slightly higher unit costs. Furthermore, there was some evidence of increasing unit costs, i.e., decreasing returns to scale, beyond the 20,000 customer level.⁵

New Zealand has 47 local distributors and retailers with a population of about 3 million. The government permitted municipal owners to select ownership structures of their own. Ownership is mixed, in some cases trusts have been created, others are owned by local councils, consumers or shareholders. Proponents of privatization argued that having consumers as shareholders would mean that company decisions would be based on the dual criteria of consumer interest and efficient commercial management. Advocates of trusts saw them as preserving an essential community asset in the community's hands in perpetuity. For most of the companies that adopted trust structures, ownership remains as it was at the time the trust was established. Privatization has not resulted in preserving ownership in the hands of consumers, since more than half of consumer shareholders have sold.

Trust companies are expected to merge to maintain their competitive positions. A series of regional groupings have formed, driven by the need to manage sophisticated wholesale purchasing arrangements. (We will argue below that such forces will also drive restructuring in the Ontario distribution sector.) As the market develops, co-operation and strategic alliances are expected to grow stronger.

In England & Wales, distribution is in the hands of twelve privately owned regional electricity companies (RECs), who jointly own the National Grid Company (NGC), the transmission company. Generation, transmission and distribution have been separated. Distribution costs are regulated on a price-cap basis relative to the rate of price inflation (RPI). The control applies to income per kilowatt hour.

³ "Restructuring the Electricity Market: A German View", Walter Schulz, in *Competition in the Electricity Supply Industry*, ed., Ole Jes Olsen, (1995).

⁴ Salvanes, K. and S.Tjøtta "Productivity Differences in Multiple Output Industries: An Empirical Application to Electricity Distribution", (1994) *Journal of Productivity Analysis*, 5, pp.23-43.

⁵ Studies currently underway of 'best practices' suggest significant potential for savings in distribution costs which could be realized without amalgamation. These studies use 'data envelopment analysis' techniques.

Distribution costs comprise about 22% of the final costs of electricity. (Given the volatility of electricity prices in the U.K. this number varies

somewhat from year to year.) Staff costs comprise about one third of operating costs, with repairs and maintenance a similar proportion.

In the last several years, most profits in the electricity business have come from the distribution segment.⁶ As a result, the regulator performed extensive statistical analyses of distributor costs to attempt to establish reasonable bench-marks. These analyses took into account such factors as size, customer mix and density, and nature of capital stock. However, because of the small number of data points (with only 12 regional electricity companies), considerable judgement needed to be exercised in coming to a conclusion.⁷

As a result of these investigations, distribution charges are being reduced dramatically over the period 1995-2000. In addition, distributor capital expenditure plans are being reduced by about 10%.

There is insufficient evidence at this point to determine to what degree the U.K. experiment will be successful and whether there will be a long term decline in the price of electricity. However, three lessons appear to be emerging. First, on the generation side, competition would have been better served if there were a larger number of generating companies competing against each other. Second, subsequent to privatization, the distribution component of the electricity price has increased to the point where more stringent regulation of this segment of the industry has become necessary.

⁶ See Electricity Distribution: Price Control, Reliability and Customer Service, Office of Electricity Regulation, U.K., October 1993.

⁷ R. Green and A. Jackson (1994) "Electricity Distribution: A Comparative Efficiency Study of the RECs" also performed regression analyses using production frontier techniques as well as 'data envelopment analyses' on U.K. distributor data. They found significant variation in distributor efficiency. The study did not find increasing returns to scale in distribution, but it should be noted that the smallest distributor serves approximately a million customers.

Third, private ownership of all three layers of the industry has led to the creation of powerful forces which are now trying to effect vertical *re-integration* of the industry. This has brought on the close scrutiny of the regulator and the Monopoly and Merger Commission.

In the United States most electricity is provided by vertically integrated, investor owned utilities, (IOU's). The remainder is distributed by publicly owned utilities (mainly municipal districts) and rural electric cooperatives. Private utility rates are regulated on the basis of a 'reasonable rate of return on capital'.

Distribution in the U.S. comes in several forms. The vast majority (over 75%) of end-use customers are served by vertically integrated, investor owned utilities. About 14% are served by publicly owned systems, many of which are municipal distributing utilities. The remainder are served by rural cooperatives.

As a result of their small size, many municipal utilities are members of Joint Action Agencies. These were formed by public power utilities which were too small to negotiate effectively in bulk power markets or to themselves build generation and transmission projects. Formation of Joint Action Agencies permitted members to pool operating and financial risks and to aggregate demand so as to make feasible the construction of power stations. Over time, these Agencies have grown to provide a broad range of services to member utilities including power supply planning and forecasting, plant operation and maintenance, fuel purchasing, demand side management, financial services and training. Furthermore, municipalization continues to be considered in various areas, principally as a response to high electricity rates charged by investor owned utilities.

Restructuring of the Distribution Sector in Ontario

The best available empirical evidence and theoretical arguments support the following propositions:

- Separation of monopolistic segments of the industry from those amenable to competition is the single most important step that can be taken towards *institutionalizing* competition in the electricity industry. Vertical separation protects against self-dealing and reduces the risk of cross-subsidy.⁸ Consequently, all distribution currently performed by Ontario Hydro and not assumed by a local distributing utility should devolve to separate unrelated independent utility commissions.
- Merger of distributing utilities with Ontario Hydro is fundamentally anti-competitive, would strengthen the monopoly power of Ontario Hydro and would require regulatory contortions to protect the consumer. Indeed, the risk of regulatory failure is substantially increased. The independence of the municipal electric utilities and the threat that they might seek supplies elsewhere strengthens the incentives for Ontario Hydro to become more efficient and to put its financial house in order. Merger of distributors with Ontario Hydro will not solve the latter's financial problems.
- The obligation to serve and supply electricity should devolve back to the level of the distributing utilities. This will prepare the industry for competition in generation by levelling the playing field amongst generators.
- Since distributors have direct contact with the customer, they should be responsible for assisting consumers in obtaining the energy services they

need. This role will expand as new energy services are developed.

- Municipalities and the customers of municipal utilities can best judge their own interests. Thus, restructuring of the distribution sector should be driven by the ability of distributors to fulfil their responsibilities to the satisfaction of their constituencies.
- Large-scale amalgamation of distributors eliminates local accountability; increases monopoly power of distributors with no demonstrable compensating benefit; impairs the ability of the regulatory authority to use yard-stick regulation / competition; and, is unnecessary since appropriate restructuring will take place once the appropriate incentives are in place. Furthermore, most customers are already served by distributors that are well beyond minimum efficient scale.
- Privatization of distribution is unlikely to lead to net benefit to the electricity customer. Statistical evidence demonstrates that private monopolistic utilities in the U.S. have higher electricity rates than public utilities. Furthermore, public ownership protects against re-integration of competitive portions of the industry with monopolistic ones, since consent of the relevant governing agency or commission would be required.

The Context Reviewed

Historically, the institutional and regulatory structure of the electricity industry has been driven largely by technological and economic factors. From the beginning of the century to the early 1970s, technological advances resulted in improved fuel efficiencies, increasing scale economies and a systematic decline in the price of electricity. Thus producers, public or private, in the U.S. and in Canada, enjoyed a favourable relationship with their

⁸ For example, a vertically integrated utility could protect itself from competition in generation by transferring some of these costs to the transmission or distribution portions of its business.

regulators and there was little interest in, or need for restructuring of what were typically vertically integrated monopolies.

Since that time, increasing costs and prices, failure to accurately predict declines in demand growth and the availability of cost effective substitutes have led to pressures to restructure. Indeed, there is widespread belief that restructuring will lead to competition in generation and lower prices through: improved capital decision making and enhanced incentives for reducing operating costs; a reduced need for regulation, particularly in the generation segment; and, increased accountability and responsiveness to customers. In some jurisdictions, the belief that change in ownership -- from public to private -- could benefit users and/or raise revenues for the government, has provided additional impetus to restructuring.

A number of important technological, economic and structural features shape the landscape of today's evolving electricity industries:

- maximum scale efficiencies in generation were reached in the early 1970s; generation of electricity is no longer a natural monopoly;
- transmission and distribution of electricity continue to be natural monopolies;
- natural gas is not only a cost effective substitute for electricity in many end-uses but also a cost effective fuel for the generation of electricity;
- innovation in information technology is creating the possibility for new energy (and other) services to end-use customers; (e.g., dual fuel homes and delivery of a range of infrastructure services by a single company);

- the industry continues to be capital intensive, though new generation technologies are less capital intensive than previous ones.

Economies of Scale and Scope vs. Productive Efficiency

Throughout these discussions, three types of efficiencies need to be distinguished: efficiency arising from increasing returns to scale, efficiency arising from expanding the scope of operations and productive efficiency.

In the presence of significant unexploited scale efficiencies, cost savings are realized by increasing the scale or size of the operation. In the distribution of electricity, this can occur through amalgamation, mergers or forms of cooperative enterprise.

In the presence of significant unexploited scope economies, cost savings are realized by expanding operations into other activities which provide goods or services at relatively low additional costs. Public utility commissions which provide multiple infrastructure services (such as electricity, water and sewage) are examples of enterprises which take advantage of scope efficiencies.

In the presence of productive inefficiencies, cost savings are realized by reducing inputs, (such as labour and capital), that is down-sizing, while maintaining the given level of output. To the extent that amalgamation reduces transparency and the size and validity of the comparison group, it can hamper improvements in productive efficiency.

Coopers and Lybrand Consulting Group Study

Beginning in 1993, the MEA and Ontario Hydro undertook a joint investigation of the retail sector in Ontario. The joint committee of MEA and Ontario

Hydro representatives was headed by an independent chair, Mr. Thomas Wells. The Coopers & Lybrand Consulting Group (CLCG) was retained to perform the study and prepare the report, (henceforth we refer to the document as the *CLCG Study*).⁹

The study found no significant unexploited returns to scale in the distribution sector. It *did* find significant potential for improving productive efficiency. In subsequent sections we draw further on the results of the study.

Guiding Principles

Prior to investigating alternatives for restructuring of the distribution segment of the industry, the MEA developed a set of guiding principles. These are:

Vision. Electricity distributing utilities shall be competitive, providing reliable services at the lowest feasible cost, with due regard for safety, health and the environment.

The municipal distributing utilities of Ontario have a history of serving their communities well. Indeed it was through their collective efforts that the Ontario Hydro system came into being in the first place. Over many decades they have exercised sound fiscal judgement and their financial state is amongst the most sound of any government related enterprise.

Structure. The distribution system structure shall be sufficiently flexible to adapt to changing technological and market conditions.

Amalgamation of distribution utilities shall occur when there is the economic rationale and political will to do so.

The evolution of electricity sectors world-wide and the potential for technological change in energy and related services requires that distributors be able to adapt to a changing environment. Such changes may include amalgamation or other cooperative enterprise if this is in the ultimate interest of their customers and communities.

Operations. Local distribution utilities shall be of sufficient size to own and competently plan, manage and operate a distribution system in order to effectively satisfy the needs of its electricity customers, including the procurement of adequate supply.

Distributing utilities recognize that in a changing environment, they may face new responsibilities, including obligations to ensure adequate supply for their customers and ever greater participation in energy services.

Ownership. The electricity distribution system shall be locally owned by its customers.

Accountability. Distribution utilities must be accountable to their customers.

Local public ownership of the distribution system ensures responsiveness to the community and its needs.

Role of Government. Government intervention shall be minimized.

⁹ The full title is *Municipal Electric Association / Ontario Hydro Joint Study into Retail Electricity Service in Ontario -- Interim Report, December 1994*.

Pricing. Distribution utilities shall operate as stand alone cost centres. No tax dollars shall be used to fund operations and, conversely, its revenues shall be used exclusively to provide services to its customers. Within this broad costing and pricing framework, commissions shall have the flexibility to design rates to meet local needs. Multi-service utilities must account for each utility separately.

The electricity business should be self-supporting and transparent without any direct government support. Nor should the industry be used to subsidize government projects or other public enterprise. The costs of distribution should be fully recovered through rates.

II. BACKGROUND AND RESTRUCTURING CRITERIA

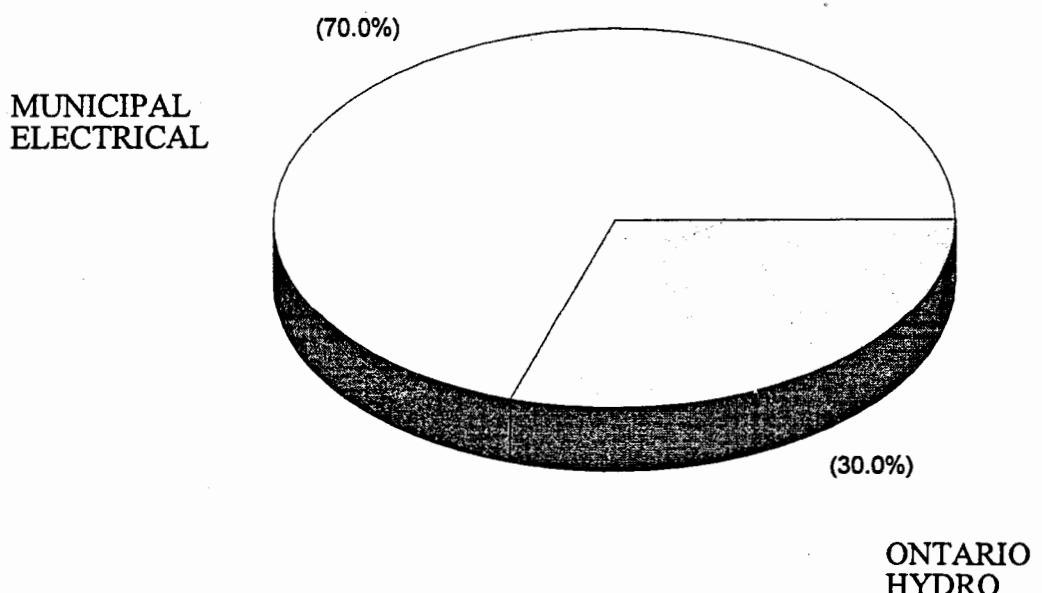
A. CHARACTERISTICS OF THE EXISTING SYSTEM

Evolution

Municipal utilities came into being in the early 1900s and they, first cooperatively, and then as part of the provincially chartered Hydro Electric Power Commission of Ontario undertook to build transmission systems and contract or build generation to serve municipal needs. As electrification progressed, some of the distribution was carried out directly by the Power Commission, later Ontario Hydro. This was always with the option that municipalities could later set up a

municipal electric commission within their boundaries and repatriate their local distribution. Over time, the policy led to growth in the number of municipal electric distribution utilities. More recently there has been some modest consolidation related, in part, to municipal restructuring. As a result, Ontario has a distribution system which is owned and operated predominantly by municipal commissions. Municipal utilities distribute over 70 per cent of the power produced by Ontario Hydro and they serve about 75 per cent of the customers in the province (see Figure 3).

Figure 3:
PROPORTION OF ELECTRICITY DELIVERED



There are also several private electricity companies that distribute power (Gananoque Light and Power Limited, Great Lakes Power Limited, Canadian Niagara Power Company Ltd.), and a few large private resource industry companies that provide some local distribution.

Ontario Hydro distributes the remaining 30 per cent of power. About half goes to 100 or so large industrial customers. The balance is delivered principally to the more sparsely settled parts of the province since Hydro is the supplier of last resort.

Other provinces have evolved in different ways. In Quebec and British Columbia, for example, provincially-owned utilities distribute directly to most but not all retail customers. There are municipal electric utilities in most provinces.

The demarcation line for distribution in Ontario is power delivered below 50 kv. The physical characteristics of the two distribution systems are summarized below (see table entitled Summary of Physical Characteristics of Electric Distribution Systems in Ontario). We discuss each in turn.

Physical Characteristics of the Municipal Distribution System

Municipal electric utilities are governed by commissions, about 70% of which are elected.¹⁰ Others are appointed by municipal authorities. The authority to create commissions is granted under the Public Utilities Act. Municipal commissions have the responsibility of overseeing the activities of the municipal utility.

The 307 municipal electric utilities serve predominantly urban or suburban areas. Based on a sub-sample of 127 for which data are available, municipal electric utilities serve between 50 and 90 customers per kilometre of distribution line. There is also a significant number of utilities which serve less dense and more rural areas within their jurisdictions.

Although their geographic area is defined by municipal boundaries at the local level (not the county or regional level), about 50 municipal electric utilities do not provide service to the full extent of their respective local municipality's boundaries.

In addition to electric services, about 100 utilities administer water and occasionally other municipal services such as transportation.

Small and medium-sized commercial-industrial customers are one-eighth of the customer base but consume over half of the power sold.

More than three quarters of municipal electric utilities serve fewer than 5,000 customers. The thirteen largest municipal electric utilities average 117,000 customers and serve half of the municipal electric utility customer base. In total, municipal utilities serve 2.8 million customers.

Although there is a large number of small municipal utilities, over 75% of municipal customers are served by utilities with a customer base exceeding 20,000.

Municipal electric utilities also serve 154 large industrial users (whose peak load exceeds 5 MW).

¹⁰ For a recent discussion of the roles of commissions in Canadian local government, see *Agencies, Boards and Commission*, D. Richmond and D. Siegel, editors, Institute of Public Administration in Canada, 1994.

Summary of Physical Characteristics of Electric Distribution Systems in Ontario*					
Distribution System	Number of Utilities/ Areas	Number of Customers Served		Power Sold	
		#	%	GWh	%
A. Municipal Electric Utilities (MEUs)	307	2,850,000	75.0	89 twh	71.2
B. Ontario Hydro -Res/Com/Small Ind -Direct Industrial	13	950,000	25.0	18 twh	14.4
		100+		18 twh	14.4
C. Total Distribution		3,800,000	100.0	125,000	100.0

* Source: *Competition, Convergence and Customer Choice*, Ontario Hydro, Sept. 30, 1995.

Summary of Financial Characteristics of Electric Distribution Systems in Ontario*					
	Municipal Electric Utilities		Ontario Hydro Retail System		Total
	\$Billion	%	\$Billion	%	\$Billion
Bulk Power Purchased	4.84	83.1	1.06	70.0	5.9
Distribution Expenditures	0.983	16.9	0.451	30.0	1.434
Total	5.823	100.0	1.511	100.00	7.334
Cost per Customer	\$348 /year		\$518 /year		

* Source: *MEA/OH Joint Study into Retail Electricity Service in Ontario, Interim Report*, December 1994, p.7,30.

Physical Characteristics of Ontario Hydro

Retail

Ontario Hydro serves predominantly rural and remote customers as well as new suburban areas not absorbed into municipal utilities, (a total of about 925,000 customers). In addition, 107 large industrial users are served directly. These customers typically take power at 230 kV or 115 kV and are largely responsible for their own transformation and distribution. They are charged at bulk power costs plus an administration fee of between 2 per cent and 3 per cent in recognition of the large amount of power they consume and the lower cost to Ontario Hydro to service their needs.

Customer density within Ontario Hydro's retail system averages 9.7 customers per kilometre of primary distribution line with a broad range from 3.9 in one northwestern area to 18.2 in a southern Ontario area.

Within Ontario Hydro's Retail System there are suburban and municipal segments with densities approaching those of municipal electric utilities.

The Ontario Hydro Retail System has two density-related rate classifications, with those below 15 customers per kilometre of line paying about 10 per cent more than customers in higher density areas.

Financial Characteristics of the Two Distribution Systems

There are substantial differences between the two systems in customer density, customer mix, size of customer base and geographic spread. Together these have resulted in significant financial differences as well.

Power generation and transmission are the largest cost components of the average power bill in Ontario.

The financial characteristics of each system, in the table entitled Summary of Financial Characteristics of Electric Distribution Systems in Ontario, are obtained from the *CLCG study*. While there have been some changes to total distribution costs since that study, the figures are indicative of the large cost differences between Ontario Hydro's system, which has a per customer distribution cost of about \$518 per annum, and the municipal system, for which the corresponding number is about \$348.

B. ISSUES AND CRITERIA FOR RESTRUCTURING

A number of issues merit consideration when assessing restructuring within the distribution sector. These include:

- economic efficiency -- both static and dynamic;
- the regulation of costs;
- the ability of distributors to fulfil new responsibilities if generation/transmission were to be restructured -- in particular, the obligation to procure adequate supply and an increased role in energy services;
- preservation of local accountability.

During the early phase of the joint MEA / Ontario Hydro retail study, the committee which oversaw the work agreed to eight criteria which should be used in assessing potential restructuring of distribution. We describe each in turn.

Reliability: The duration and frequency of service interruptions are key measures of service reliability.

Reliability statistics are collected by Ontario Hydro and many municipal electric utilities.

Costs: Restructuring has various cost implications. These include the potential savings/increases in controllable costs,¹¹ potential savings/increases in capital and other costs, and, one-time implementation costs.

Rate Equity: There should be a direct relationship between the price that a customer (or group of customers) pays for electricity and the cost of providing the service within a service territory with reasonably homogeneous customer density and other service characteristics.

Customer Satisfaction: This is a composite measure of overall customer satisfaction with service, timeliness, quality and cost of the product delivered. Such information is available from customer surveys. Municipal utilities compare favourably with Ontario Hydro in this category. (See Appendix IV of the *CLCG study*.)

Capability to Deliver Range of Services: This factor measures whether restructuring increases the capability of the system to deliver a full range of services.¹²

Customer Influence: This measures the extent to which restructuring improves or diminishes the ability of the customer to be heard by the distributor.

Local Accountability: This measures the extent to which the distributor, through its management and governance structure, can be held accountable for its actions (service quality, financial and operational) by its stakeholders.

¹¹ Controllable costs include billing and collection, operations, maintenance and administration (OM&A).

¹² Local demand for such services would, of course, be a precondition for requiring such capability.

Ease of Implementation: This composite index measures a number of implementation factors including:

- disruption to existing political relationships
- degree of political resolve required
- legislative change required
- extent to which there will be major ownership changes in assets
- extent of transfer of employment and changes in condition of employment
- the restructuring challenge in terms of number and size of entities to be restructured
- customer impact and acceptance.

C. STATISTICAL RESULTS CONTAINED IN THE COOPERS AND LYBRAND CONSULTING GROUP STUDY

U-Shaped Cost Curves

The recent *CLCG Study* did not find significant unexploited returns to scale in municipal utility distribution.¹³ Controllable costs per customer declined moderately as the size of the utility increased to the range of 16,000 to 32,000 customers. Then costs per customer *increased* as scale increased. Thus, the unit cost curve appears to be U-shaped with moderate increasing returns at the low end and strong decreasing returns to scale at the high end. According to the study, per customer controllable distribution costs appear to be at a minimum for utilities that serve 16,000 to 32,000 customers (see Figure 4). (Even allowing for substantial estimation variability, these results clearly rule out large scale amalgamation of distributors.)

The figures used in the compilation of these cost curves are not adjusted for specific attributes of distributing utilities (such as density, age of equipment, customer mix). Statistical analyses,

¹³ Municipal Electric Association / Ontario Hydro Joint Study into Retail Electricity Service in Ontario -- Interim Report (Toronto: 1994). (*CLCG Study*)

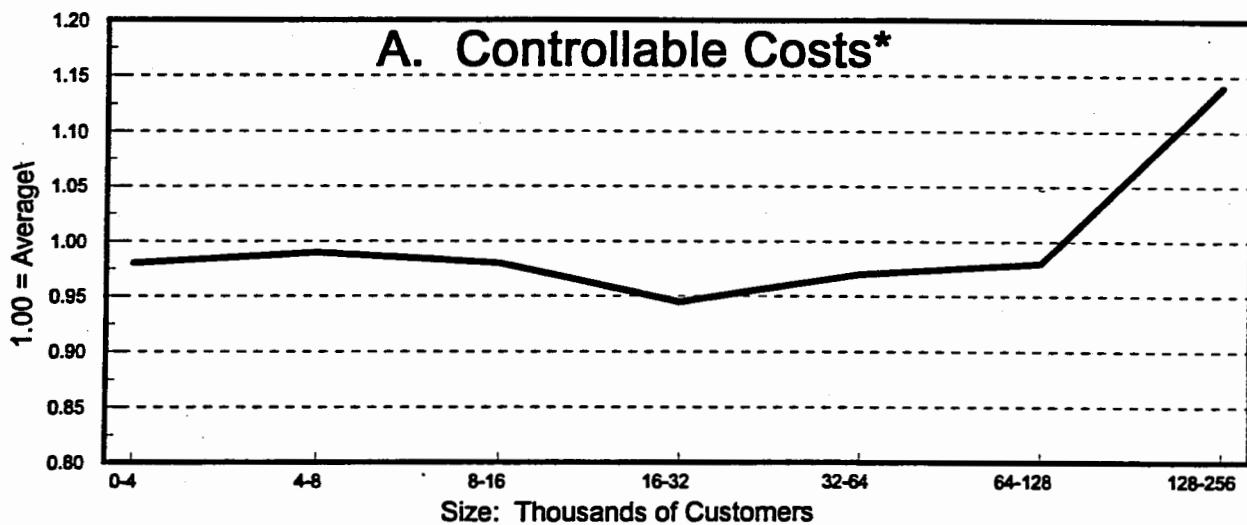
which controlled for these factors, contained in the study did not find significant returns to scale in municipal utility distribution.¹⁴

An additional important observation must be made in connection with this analysis. While there is a large number of very small utilities (well over 200 serve

fewer than 5,000 customers), about 75% of customers are served by utilities that have 20,000 or more customers and hence lie to the right of the minimum of the Controllable Cost curve. (As we have stated earlier, a detailed statistical analysis found that optimal scale efficiencies in Norway were achieved for utilities serving about 20,000 customers.)

Figure 4:

**Ontario Municipal Utilities
Variance of Cost per Customer with Size of Utility**
1 = Average of all MEU's
(excluding the highest and lowest cost utility in each size range)



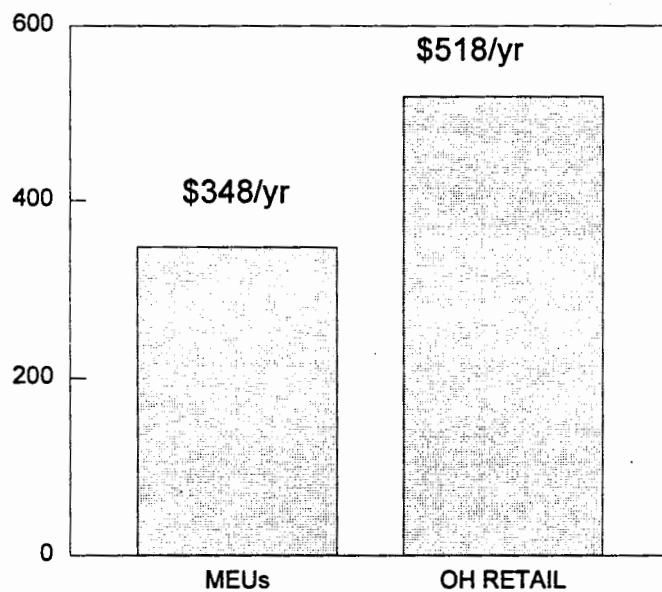
(*excluding high voltage, customer service costs)

¹⁴ CLCG Study, p.74 states "...there is a weak relationship showing diseconomies of scale with increasing utility size."

Where the study did find potential for efficiency gains was in Billing and Collection and Administration. Operations and Maintenance costs, on the other hand, increased with the size of the distributing utility.

For Ontario Hydro distribution, the *CLCG Study* did find evidence of increasing returns to scale.¹⁵

**Figure 5: DISTRIBUTION COSTS
(PER CUSTOMER)**



¹⁵ With 48 retail distributors at that time, the coefficient of customer base was negative. While the corresponding t-statistic was not reported in the study, (see p.68), replication of the results indicates a value of -1.8 which is moderately significant.

A second area upon which the study focussed was a comparison of municipal utility costs to those of Ontario Hydro Retail. Total distribution costs were about \$348 per customer per year for municipal utilities and \$518 for Ontario Hydro Retail as illustrated in Figure 5 (see also Figure 6). Large cost differentials between the two distribution systems have been present historically and continue today. Focusing strictly on OM&A costs in comparing relative efficiencies of Ontario Hydro Retail with municipal utilities, as Ontario Hydro has done recently, is inappropriate without:

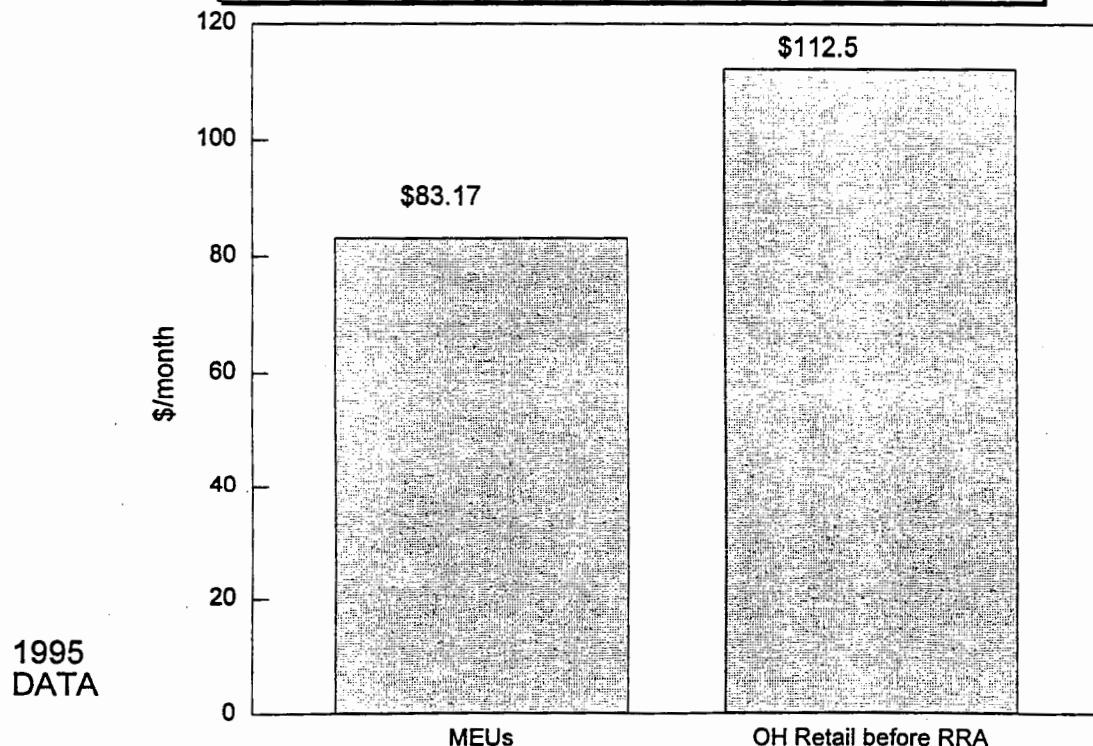
- assessment of current accounting treatment of various costs (Ontario Hydro has in the past capitalized various OM&A costs);

■ assessment of allocation of overhead costs and other cost allocation methodology at Ontario Hydro; a fair assessment is difficult, given that Ontario Hydro remains vertically integrated, which creates opportunities for cross-subsidization;

■ assessment of maintenance levels, in particular, reduced maintenance levels, which are not immediately reflected in lower reliability, but over time can lead to additional and often excessive capital expenditure requirements (such 'harvesting of assets' does not serve the long run interests of the rate payer).

Since the time of the study, both Ontario Hydro Retail and a number of distributing utilities have succeeded in substantially reducing costs.

**Figure 6: WEIGHTED AVERAGE BILL
AT 1000 kWh**



III. RESTRUCTURING THE DISTRIBUTION SECTOR

A. STRUCTURE OF DISTRIBUTION

1. Vertical Structure

Separation of Functions

In Ontario the electricity industry is partially integrated, with generation, transmission and some distribution and energy services performed by one firm. Most local distribution and additional energy services are performed by municipal utilities. The overwhelming majority of electricity industry assets are in the public sector.

Whether or not separation of distribution from other industry functions should be effected is driven by two opposing considerations. On the one hand, there may be economies of scope arising from incorporating industry functions within a single entity. On the other hand, there is considerable risk that a vertically integrated utility will preserve the incumbent's ability to create and sustain barriers to competition.

Recently, arguments have been raised that demand-side management (DSM), integrated resource planning (local or system wide), decisions on 'distributed generation', (i.e., small scale local generation) and optimal trade-offs between distribution, transmission and generation investments are best performed within an integrated utility. It has also been argued that some degree of centralized decision making is desirable if environmental issues are to be addressed properly.¹⁶

The essence of the counter-argument is that, so long as prices for alternate resources are set correctly, a vertically separated industry will make optimal decisions -- acquiring additional supply if that is cheapest, adding to distribution capacity or investing in demand side management (DSM) if those options are the most desirable.

Furthermore, since distribution, transmission and generation can, at the margin, compete against each other,¹⁷ retaining these functions within a single entity would forego the benefits of such competition.

The empirical evidence on anti-competitive and thus inefficient behaviour of vertically integrated monopolies is sweeping. The history of the gas and oil pipeline industries is replete with examples of attempts by pipeline owners to favour their own sources of supply. More recently, separation or unbundling of transmission from supply has been the direction taken in the U.S. natural gas industry. Such considerations also formed the basis of divestiture in the U.S. of the Bell operating companies from AT&T. (Local service was seen to create a bottle-neck monopoly.¹⁸)

Indeed the *prima facie* case that a public or private corporation with monopoly power will act to preserve and advance its *own* interests, which include retention of monopoly power, is strong.¹⁹

¹⁷ For example, if there is insufficient transmission capacity into a load centre, a distributor might find it more cost-effective to self-generate or invest in DSM. This puts competitive pressure on the supplier of transmission.

¹⁸ "Halfway Home: U.S. Telecommunications (De)Regulation in the 1970s and 1980s", by Robert Crandall, in *Regulation*, Jack High Ed., (University of Michigan Press: 1991).

¹⁹ Any discussion of the efficiency and benefits of competition assumes that firms will act in their own (or ideally, in their owners') interests.

¹⁶ See e.g., Cohen, Armond and S.Kihm : "The Political Economy of Retail Wheeling, or How to *Not* Re-Fight the Last War", (April, 1994) *Electricity Journal*, at pp.49-61.

Thus, the regulatory blueprint has often involved separation of the portions of the industry that are potentially competitive from those that are natural monopolies.

In summary, *separation of monopolistic segments of the industry from those amenable to competition is the single most important step that can be taken towards institutionalizing competition in generation.* Implementation of competition is easier if transmission and distribution assets reside in corporations that are separate from those owning generation assets. Any benefits arising from vertical economies of scope are, in all likelihood, outweighed by the benefits of separation. Such benefits include increased potential for competition and transparency of costs.

Distribution Should be Separated From Ontario Hydro

The central logical implication of vertical separation arguments for restructuring of distribution in Ontario is that *all distribution currently performed by Ontario Hydro and not assumed by a local distributing utility should devolve to independent entities.*

These entities should be governed by utility commissions that operate under the same conditions that apply to all utility commissions. Part of the mandate of these commissions should be to assist municipalities to assume responsibility for distribution within their area. The relationship between local government and distributing utilities should be arm's-length.

Merger With Ontario Hydro is Anti-Competitive

It has been suggested by Ontario Hydro²⁰ that merger of the distributing utilities with Ontario Hydro would be desirable. The fatal flaws in this proposal are evident. Such a merger would be fundamentally anti-competitive, would strengthen the monopoly power of Ontario Hydro and magnify regulatory problems.²¹

Merger Will Not Solve Ontario Hydro Financial Problems

Another argument that has been raised by Ontario Hydro is that merger of the distributing utilities with Ontario Hydro is desirable because it would enhance Ontario Hydro's balance sheet and eliminate the risk of exit by municipal utilities who could arrange alternative sources of supply. Indeed, their study states:

"The fact that 308 individual entities could move as a whole, in groups or individually to threaten Ontario Hydro's load and thus its ability to service its debt is a significant risk factor...this situation should not be permitted to continue until a fundamental restructuring of the industry takes place."²²

²⁰ See the report of the Financial Restructuring Group *Ontario Hydro and the Electric Power Industry*, June 1995 and *Competition, Convergence and Customer Choice*, September 1995.

²¹ In this connection it is worth noting the following: "The main failure of the UK privatization programme was to identify sufficiently precisely the areas where natural monopolies existed, to separate those from the remainder of the industry and to introduce competition elsewhere. One of the most striking examples of this was British Gas. Despite the possibilities for competition.... British Gas was sold as a single integrated company. Its subsequent performance has been disappointing and the Monopolies and Mergers Commission has recommended a fundamental restructuring of the industry." from "Introduction: Privatization in Performance", M. Bishop, J. Kay and C. Mayer, in *Privatization and Economic Performance*, p.10.

²² Report of the Financial Restructuring Group *Ontario Hydro and the Electric Power Industry*, June 1995, p.13.

But it is exactly this pressure and the pressure of large industrial customers that has caused Ontario Hydro to change.

The objective should be to maintain pressure on Ontario Hydro through the municipal electric utilities and large industrial customers.²³

Distributing utilities across Ontario recognize that uneconomic bypass and stranding of assets is not in the interest of its customers. To minimize this risk, without sacrificing autonomy, the Municipal Electric Association has signed an agreement with Ontario Hydro and the Minister of Environment and Energy dealing with non-utility generation (NUG). The 'NUG Agreement' provides for an orderly approach to non-utility generation and self generation. It ensures that no other utility sees an increase in power costs or a decline of service quality if a particular municipal utility chooses to self-generate or purchase non-utility generation.

While merger will improve the *pro forma* balance sheet of Ontario Hydro, it will only serve to disguise the real financial problems. These are a consequence of its own past excesses, its ambitious building programs and its unwillingness to focus on debt reduction. Indeed, in the early 1990s, Ontario Hydro was requesting approval for the construction of 8000 MW of nuclear facilities (about the equivalent of two Darlington stations), 4300 MW of fossil generation and 2000 MW of hydraulic generation.²⁴ The proposal was not withdrawn until early 1993.

²³ These are not the only sources of pressure on Ontario Hydro. Inter-fuel substitution also constitutes a threat to Hydro load.

²⁴ Environmental Assessment Board Hearing into Ontario Hydro's Demand/Supply Plan, Ex 452, p.4.

Transmission and Distribution Should Be Separated

Since transmission and distribution are both natural monopolies, it could be argued that they should be merged into a single 'wires' monopoly. The pivotal issue is whether there are economies of scope that could be exploited by having bulk and retail delivery systems combined into one. Thus far, there is no empirical evidence of such scope economies.

A much stronger case can be made for separation of these functions. Transmission is a natural monopoly at the *provincial* level. Distribution is a natural monopoly at the *local* level. Creation of a single 'wires' monopoly would not serve the public interest because:

- Such an entity would sacrifice local accountability and responsiveness to local needs.
- Multiple distribution companies would exert pressure on the transmission company, (as they do today on Ontario Hydro). Such pressure would be lost in a merger.
- A single 'wires' monopoly would have much greater monopoly power than the collective strength of a transmission company and the distributors.
- The option for 'yard-stick regulation / competition' in the distribution sector would disappear.

In the presence of 'natural monopolies', there is no reason to create monopolies that are larger than their natural boundaries. The natural boundaries for distribution are much smaller than for transmission.

2. Transfer / Devolution of Responsibilities

Obligation to Serve and Supply

Common to many electricity systems world wide is an *obligation to serve and supply*, a concept by which an end use customer must have access to electricity and the system is required to meet all reasonably expected demand.

In Ontario, municipal utilities must serve all customers within their franchise areas. They are charged with the obligation to serve. Ontario Hydro (reflecting the pooling of municipal and other customer interests) has an obligation to meet the needs of the municipal utilities and its own retail customers. That is, Ontario Hydro is charged with an obligation to supply.

When competition is introduced in the generation segment, generators cannot be responsible for predicting future demand and acquiring adequate supply to meet such demands lest their ability to compete is impaired.

Three possibilities remain for the obligation to supply. The obligation could be transferred to the transmission company, to distributors or it could disappear entirely.

The latter scenario assumes that the market will provide adequate supply and requires implementation of retail access in the province. A companion paper entitled *Retail Access vs The Pool Purchaser Model*, concludes that retail access is inappropriate for Ontario.

In all likelihood there would be strong political pressure to ensure that *some* entity has an obligation to supply. This has been clearly indicated to municipal utilities by their customers. The most appropriate entity for this purpose is the distributing utility. (In Ontario, municipal utilities were

originally charged with this obligation.) This arrangement enhances political accountability which would be to local governments rather than to the provincial government. It is consistent with the notion of decentralization of responsibilities, and, as we will argue below, provides a potent impetus for rationalization in the distribution sector.

It is important that competing generators be relieved of this responsibility as soon as possible. During the transition period it is most likely appropriate for the transmission company to assume the responsibility of ensuring that adequate supply is available. This will give the distribution segment of the industry time to prepare for the assumption of its new obligations.

To summarize, in order to level the playing field amongst generators, they should be relieved of the obligation to supply. This responsibility should devolve back to the level of the distributing utilities who are already charged with the obligation to serve.

Energy Services

Energy services are currently in a state of evolution. The advent of ever cheaper information technology is paving the way for an ever richer set of choices for the customer. Depending on the scope and scale economies that emerge within the industry, there may be pressure on some utilities to amalgamate in order that delivery of such services can be facilitated.

The reasons for situating energy services at the distribution level are evident:

- to the extent there are economies of scope in the delivery of services, they will be present at the distribution level;²⁵
- the distributor has direct contact with end-use customers, is most sensitive to their needs and is most accountable to local government.

Principal responsibility for delivery of such services should lie with distributing utilities or with independent energy service companies. At the very least, distributors should bear responsibility for assisting end-users in obtaining services they need.

3. Theories of Convergence

Convergence models typically require some form of retail access and so are examined in the companion paper *Retail Access vs The Pool Purchaser Model*. For present purposes, we will address the relevance of these theories to the structure of the retail sector.

Convergence theories argue that infrastructure services, such as distribution of electricity and gas, energy services, water, information and home security are moving together towards a new form of customer service.

Although there is every expectation that customers will demand an ever expanding range of energy services (some of them involving the processing of information), such developments do not alter the central recommendations being made here about the distribution sector:

- **Vertical unbundling should still occur.** Generation must still be separated in order that competitive forces can take hold. Nor is there any

evidence that transmission and distribution cannot be separated. (We note that in telecom and natural gas, local and long distance transmission have been separated without detriment.) In short, any potential for economies of scope in end-use services does not imply similar economies of scope among generation, transmission and distribution.

- **Theories of convergence do not imply that large-scale amalgamation should occur.** Instead, as we will argue below, the need to ensure that the customer has access to an ever broader range of energy services will provide a strong incentive for utilities to amalgamate with neighbouring utilities, or to enter into close relationships with energy service companies.²⁶

The presence of multiple distributors provides a setting where different communities can continue to develop energy (and other infrastructure) services in different ways. If one distributor is able to provide better product, a new service or combination of services at appealing prices, other municipalities will follow. This form of indirect competition is both more democratic because local preferences are taken into account, and more beneficial to the province as a whole since a variety of natural experiments are conducted.

4. The Restructuring Process

Initiatives and Drivers of Distribution Restructuring

There have also been calls for fundamental restructuring of distribution as part of a general house-cleaning of the industry. What is less

²⁵ The presence of existing economies of scope in delivery of infrastructure services is illustrated by the presence of public utility commissions which provide multiple services.

²⁶ Statistical analysis of past data cannot be used to determine whether a new (multi-product) production function will exhibit increasing returns to scale and/or scope large enough to justify large scale amalgamation amongst distributing utilities. However, at such a time, it is precisely the presence of such increasing returns that would create incentives for amalgamation.

frequently noted is the fundamental asymmetry between the structure of the distribution sector, which is highly decentralized, and generation / transmission which is a monopoly firmly in the grasp of Ontario Hydro. Breaking up a powerful monopoly is difficult and *requires* external action. A monopolist has no natural interest in giving up control, even if it is in the interest of the consumer.

Restructuring and consolidation of distributors, which at best have local monopoly power, requires putting the right incentives in place so that it take place in an optimal fashion and so that it is in the best interests of local customers.

The most important drivers and incentives that should propel restructuring of the distribution segment are:

- the responsibility to fulfil the obligation to serve and supply;
- the responsibility for forecasting and contract negotiating;
- the requirement that all municipal distributors extend service to their municipal boundaries;
- the responsibility for facilitating and assisting in the delivery of energy services where they are desired;
- the potential for scale economies, i.e. cost savings through amalgamation / cooperation with neighbouring utilities;
- the potential for scope economies, i.e. cost savings through consolidation of electricity distribution with other services (such as water, sewage);
- the preferences and desires of local customers;

- accountability to the customer and the local community;
- the requirements for reliability and good customer service.²⁷

Proposals for Regional Amalgamation

One alternative being proposed is that the current system of local utilities be replaced with a small number of much more powerful regional monopolies (say 12) in order to increase efficiency of distribution.

This is an undesirable arrangement. First, it eliminates local accountability. Second, it dramatically increases the monopoly power of distributors with no demonstrable compensating benefit. (The *CLCG Study* found no evidence to support this degree of amalgamation.) Third, it impairs the ability of the regulatory authority to use yard-stick regulation / competition. Fourth, as we have claimed above and will argue below, imposing an arbitrary restructuring plan is unnecessary in the distribution segment of the industry and, indeed, is inferior to incentive-driven restructuring. Finally, the creation of 12 powerful regional monopolies would be much more difficult to reverse and would likely have undesirable effects on the consumer.²⁸

In summary, proposals to create a small number of regional monopolies should be rejected. There is no reason to expect that such utilities will be easier to

²⁷ Statistical evidence suggests that municipal utilities exhibit at least as good reliability performance as large vertically integrated utilities. See e.g., *1993 Annual Service Continuity Report on Distribution System Performance in Canadian Electrical Utilities*.

²⁸ A related point is made by Beesley and Littlechild in their discussion of privatization: "When in doubt, smaller rather than larger successor companies should be created and allowed to merge thereafter, subject to rules of competition policy..." from "Privatization: Principles, Problems and Priorities", M. Beesley and S. Littlechild, *Lloyds Bank Review*, July 1983.

control or regulate, that there will be a net benefit to the consumer or that they will be more responsive to local needs.

Incentive Driven Restructuring

Consider the following hypothetical scenarios that illustrate the contrast between restructuring by fiat and an incentive-driven process that is guided by the needs and interests of end-use customers and their communities. If, tomorrow, the existing system of municipal utilities and Ontario Hydro Retail was replaced by 12 regional distributors, totally separate from Ontario Hydro, little change could be expected to occur within the transmission and generation segments. Restructuring of the distribution sector is not a necessary condition for changes in transmission and generation, and will not drive such changes. Nor is it a necessary prior condition for introducing competition in generation, the segment of the industry where restructuring and deregulation can have the greatest impact.

On the other hand, suppose, as of tomorrow, vertical unbundling has occurred, distributors have the obligation to procure adequate supply and must assist customers in obtaining additional energy services. With these responsibilities devolved to distributors, new alliances, cooperatives and amalgamations would form rapidly, (as they are forming in New Zealand). The newly formed entities would not all be of similar size or character -- this would depend on geographical and other exigencies. However, it is much more likely that they would have been formed sensibly because they would be responding to real forces and not autocratic ones.

A good example of alliances that emerged spontaneously in response to the need to procure adequate supply are U.S. Joint Actions Agencies. These were formed by public power utilities which were, individually, too small to negotiate effectively

in bulk power markets or to themselves build generation and transmission projects. Formation of Joint Action Agencies permitted members to pool operating and financial risks and to aggregate demand so as to make feasible the construction of power stations. Over time, these Agencies have grown to provide a broad range of services to member utilities including power supply planning and forecasting, plant operation and maintenance, fuel purchasing, demand side management, financial services and training.

Finally, restructuring of the industry will not only increase the responsibilities of distributors, but will also likely increase the risks they face. This too will provide impetus to restructuring.

B. OWNERSHIP OF DISTRIBUTION

Public vs Private Ownership

Conventional property rights arguments assert that privately owned companies are likely to be more efficiently run than those in the public sector. Public ownership is seen as being too diluted to provide an adequate lever on company performance. In the extreme case of centrally planned economies, the absence of both 'exit' and 'voice'²⁹ results in woefully inadequate performance of state firms.

In mixed economies, there are typically two breeds of companies in industries that are natural monopolies: publicly owned firms and regulated private enterprises. The governance structure of each is subject to its own vulnerabilities, limitations and ultimately failures. Public corporations do not have the profit motive but often appropriate monopoly rents in other ways (e.g. for the benefit of

²⁹ See Hirschman,A.,*Exit Voice and Loyalty: Responses to Decline in Firms, Organizations, and States*, (Cambridge, MA: Harvard Univ. Press, 1978) for definitions of these terms.

labour or for policy purposes). Given their more direct accountability to political bodies, residential and commercial rates of public enterprises are often lower than those at private utilities.

Private regulated enterprises, particularly those that are regulated on a rate of return basis, tend to over-invest in capital (the Averch-Johnson effect).

Lower-priced, public sector electricity has been the subject of much attention for most of this century.³⁰ Analysis of recent cost and price data of U.S. public and private electric utilities indicates that, even after adjusting for a variety of factors (including scale of operation, factor costs, access to hydroelectric sites, taxes and capital cost discrepancies), publicly owned electric utilities in the U.S. have rates significantly lower than private utilities.³¹

In England and Wales, there is evidence that private distributors have been generating excess profits. As a consequence, the regulator has put severe restrictions on distributor margins.

The relevance of these results to the present discussion is that privatization of *distribution* assets

³⁰ Franklin Roosevelt, while he was governor of New York, strived to lower electricity rates which he pointed out were more than twice as high in Buffalo as across the Niagara River in Canada. During his presidency, he established major public electrification projects such as the Tennessee Valley Authority. (*Roosevelt: A Rendezvous With Destiny*, F. Freidel, Little, Brown and Co., 1990, p.64.)

³¹ See Kwoka, J. "Pricing in the Electric Power Industry: The Influence of Ownership, Competition and Integration", (1995: Harvard Institute of Economic Research Working Paper); see also Boardman, A. and A. Vining, "Ownership and Performance in Competitive Environments: A Comparison of the Performance of Private, Mixed and State-Owned Enterprises", (1989) *Journal of Law and Economics*; Atkinson, S. and R. Halvorsen, "The Relative Efficiency of Public and Private Firms in a Regulated Environment: The Case of U.S. Electric Utilities", (1986), *Journal of Public Economics*; Fare, R., S. Grosskopf and J. Logan "The Relative Performance of Publicly-Owned and Privately-Owned Electric Utilities", (1985), *Journal of Public Economics*. Peltzman, S. "Pricing in Public and Private Enterprises: Electric Utilities in the United States", (1981), *Journal of Law and Economics*.

(or for that matter, transmission assets) will not convey any significant customer benefits.

Finally, public ownership protects against re-integration of competitive portions of the industry with monopolistic ones as is occurring in England and Wales where distribution, transmission and generation are in the private sector.

C. REGULATION OF DISTRIBUTION

Current Regulatory Environment

Municipal utility rates are regulated by Ontario Hydro. Municipal utilities are also responsible to their local constituencies. This arrangement differs from the U.S., where most municipal utilities are not regulated but are controlled by municipal bodies.

Distribution is a local natural monopoly so that direct competition is, at this point, infeasible. Other mechanisms must be relied upon to promote efficiency.

Given that municipal utilities are accountable to their local constituencies, it can be argued that regulatory authority should also reside at this level. Distribution is a local service, under local control, and like other municipal services, is appropriately within the jurisdiction of municipal authorities.

Yardstick Regulation / Competition

There is a fundamental question whether municipal authorities could effectively fulfil this regulatory responsibility in view of the substantial information that would be required to properly assess costs. Regulatory oversight would be further complicated by the fact that the cost of distribution is currently 'bundled into' the price of electricity.

The presence of a large number of distributing utilities in the province provides a solution to this problem. Data from the many utilities can be used to form a sound statistical basis for comparison. A number of techniques are available which could be used to determine 'best practices'.³² Such an approach was recently applied in Norway which has over 200 distributing utilities. The study found that by moving to best practices, significant cost savings could be realized (without restructuring). The analyses could not have been performed if Norway was served by a small number of distributors.

In contrast, the U.K. system has 12 regional distributors in England and Wales, with two additional ones in Scotland, but the latter remain vertically integrated with generation. A statistical comparison of costs which properly adjusts for differences in local conditions, such as customer density, age of equipment, customer mix, proportion of below-ground distribution lines and local wage costs becomes much more difficult. Indeed, efforts to perform such analyses by the U.K. regulator met with mixed results.³³

In the water industry in England and Wales, the regulator has stated his opposition to mergers unless there are very clear economy of scale benefits. His stated reason is that mergers reduce the number of comparable companies available for yardstick comparisons.³⁴

³² Such techniques include production frontier analysis and data envelopment analysis. These are the econometric and operations research equivalents to 'best practice' analysis. See e.g., Green R. and A. Jackson "Electricity Distribution: A Comparative Efficiency Study of the REC's", (1994) manuscript, Department of Applied Economics and Fitzwilliam College, Cambridge.

³³ See *Distribution Price Controls: Proposals*, Office of Electricity Regulation, August 1994.

³⁴ There are ten companies in England and Wales which provide both water and sewage services. There are also 25 companies supplying only water. See "Introduction: Privatization in Performance", M. Bishop, J. Kay and C. Mayer, and "Privatization and Regulation of the Water Industry in England and Wales", by S.

In order to enhance transparency and comparability of costs, however, all distributors in Ontario -- the municipal utilities and the descendants of Ontario Hydro Retail -- should be required to subscribe to a uniform accounting methodology.³⁵ Furthermore, Public Utility Commissions providing multiple services should segregate costs associated with the distribution of electricity.

Within this framework, a useful mechanism for enhancing control of distributor costs while maintaining local control would be 'yard-stick competition'. Under this approach, distributor margins could be compared across jurisdictions, taking local conditions into account, in order to establish cost-minimizing budgets and 'best practices'.

Indeed, such comparisons are already taking place on an informal basis amongst utilities -- when one distributor announces a zero rate increase, others face pressure to follow suit. (The pressure comes both from political sources as well as more directly from industrial customers.) The basis for this process is a series of utility performance indices provided by municipal utilities, and compiled by the Municipal Electric Association. Among the indices that are tracked are various ratios measuring differences in rates charged to customers, financial ratios (such as net income, debt/equity ratio, gross margin), measures of operating efficiency (such as operation and maintenance costs, administration costs, controllable costs), reliability ratios and human resource statistics. Participating utilities have access to data from other utilities and use the results to manage and reduce their own costs.

Cowan, in *Privatization and Economic Performance*, p.8, 112-136.

³⁵ Currently, municipal distributors are required to submit financial statements in a standardized format.

In summary, the ideal would be to replace regulation with market discipline, ('competition where possible, regulation where necessary'). Such may very well be possible within the generation segment of the industry. For the distribution segment, a degree of competitiveness could be injected through the introduction of 'yard-stick' competition. The presence of a large number of utilities of (almost) all size-ranges affords important informational advantages: there is a large data-base available for estimating bench-marks, as well as a large number of natural experiments. This in turn would help to overcome the usual informational asymmetries between the utility and those to which it is accountable, and enhance the potential for establishing a sound statistical basis for yard-stick competition. The approach would enhance local control of distribution costs as well as forming part of a scenario where regulation of distribution costs formally devolves to the municipal level.

Finally, it is worth pointing out that the differing scope, degree and nature of regulation that is appropriate for generation, transmission and distribution constitutes another argument in favour of vertical separation of the industry.

IV. CONCLUSIONS

Structure

Separation of distribution from Ontario Hydro.

The distribution of electricity should be separated from transmission and generation.

All distribution currently performed by Ontario Hydro and not assumed by a local distributing utility should devolve to separate, unrelated, independent utility commissions that will operate under the same conditions that apply to all utility commissions. Part of the mandate of these commissions should be to assist municipalities to assume responsibility for distribution within their area.

This will protect against cross-subsidy and self-dealing and prepare the industry for competition in generation. Furthermore, it will increase transparency and facilitate regulation of the various strata in the industry, each of which requires a different remedy.

Obligation to serve and supply. These obligations should be transferred from Ontario Hydro to the distributors.

This step is essential to begin to level the playing field amongst generators and will be an important driver in the restructuring of the distribution system.

Restructuring of Distribution. Once the distribution function has been separated from Ontario Hydro, the distribution system as a whole should undergo restructuring.

Uniform utility structures (e.g., size and types and levels of service) throughout the province are neither necessary nor desirable. It is desirable for all

distribution utilities to be capable of purchasing power at the grid voltage. Nevertheless, distributing utilities should be no smaller than a municipality and no larger than a region, county or district. Principal drivers of the restructuring process should be:

- the requirement for distributors to fulfil the new responsibilities, in particular, the obligation to serve and supply and facilitation of the delivery of energy services;
- scale economies, i.e., the potential for cost savings through amalgamation / cooperation with neighbouring utilities;
- scope economies, i.e. the potential for cost savings through consolidation of electricity distribution with other services such as water, sewage;
- the preferences and desires of local customers;
- accountability to the customer and the local community;
- reliability and customer service.

An incentive driven restructuring process will ensure that the distribution system evolves in a way that responds to real forces rather than a predetermined arrangement.

Local studies should be undertaken to ensure that any cost effective changes that will benefit customers occur in a timely and proactive fashion, and that the final decision on restructuring of distribution should be made at the local level, with such legislative support from the province as is necessary.

Horizontal integration of services. Horizontal integration (i.e. utilities offering multiple services) should be considered where it is cost effective for the customers and is consistent with local values.

Horizontal integration of services could reduce costs through economies of scope.

Ownership

Local public ownership of distribution. Distribution of electricity in Ontario should be provided by locally owned, shoulder to shoulder (i.e., contiguous), distribution utilities.

Local ownership will ensure accountability and responsiveness to local needs. Public ownership will also protect against re-integration of the industry as is taking place in the United Kingdom.

Regulation

Regulation by Local Commissions. Local utility commissions should be the regulatory authority subject to provincial standards and guidelines.

Regulation at the local level will ensure accountability to the end-use customer. A mechanism to ensure uniformity of accounting procedures and performance measures will overcome informational barriers and ensure that yard-stick competition / regulation can be put in place. The mechanism can build on existing performance measures that are collected by the Municipal Electric Association.

Impacts

Development of yardstick competition amongst distributing utilities will put downward pressure on distribution costs. While such costs comprise only

15% of the final price of electricity, substantial savings can be made and sustained. Such savings are *not* sustainable if distribution is amalgamated into Ontario Hydro or if a small number of regional distributors are created. In either case, there will be no sound informational basis for properly assessing costs.

Vertical separation of the industry will not only enhance transparency, but will also protect against monopoly abuses which are common to vertically integrated firms.

Devolution of the obligation to supply to distributing utilities will ensure that needs are met. It will also be a major driver of restructuring of the distributors.

RETAIL ACCESS
VS THE POOL



Municipal Electric Association

**RETAIL ACCESS VS.
THE POOL PURCHASER MODEL**

Submission to the
**ADVISORY COMMITTEE ON COMPETITION
IN
ONTARIO'S ELECTRICITY SYSTEM**

RETAIL ACCESS VS. THE POOL PURCHASER MODEL

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I. CONTEXT

The electricity industry in Ontario faces pressure for change. The fundamental driving force is the cost of Ontario Hydro power compared to the low cost opportunities available from new natural gas-fired capacity. This difference is the reason that existing capacity appears uneconomic. If some customers are able to opt out of the existing system, they will leave the remaining consumers with the financial obligations for the existing system, which must be paid one way or another. To manage the current problems, minimize their costs, and assure that such problems do not arise in the future, structural change in the industry is required. A central goal of such change must be increased transparency and accountability. Participants in the industry need to know how it functions, and decision-makers must be

accountable for their actions. Many proposals for change focus on the role of competition. In the short-run, however, unfettered competition may threaten the ability of the province to retire the Ontario Hydro debt without resort to taxation.

This paper examines two generic approaches to electricity industry restructuring, the retail access model and the pool purchaser model. In addition, a variant of the retail access model, the convergence model, which has been proposed by Ontario Hydro, is also reviewed. These models are assessed for their ability to increase efficiency, transparency and accountability, preserve equity, and manage the Ontario Hydro debt.

II. RETAIL ACCESS MODEL

A. DEFINITION

Electricity consumers typically purchase from a single franchised monopolist. It may be a distribution company or a vertically integrated utility. The defining commercial reality, however, is that there is no choice of providers, only a single seller who delivers over a single set of wires that connects the customer to the bulk power system. The retail access model proposes to change this situation by offering customers a choice of suppliers. This model does not envision competition between separate wires companies who would each construct their own networks to customers. Instead, there would be a single wires company providing a monopoly service. Access to the wires, however, would be made available on a non-discriminatory basis to any supplier who seeks to make supply arrangements for a willing customer. Thus retail access in electricity resembles the competition in long-distance telephone services that is currently a feature of telecommunications restructuring in a number of countries. A similar model has been implemented to some degree in natural gas distribution. Competition among suppliers occurs over a common carrier network to which all buyers and sellers have equal access.

The analogy of retail access in electricity with similar access in telecommunications, or natural gas, is imperfect. The technical characteristics of the electricity industry differ considerably from other networks where retail access has been made available. To understand the retail model as it might apply in electricity requires that the properties of electric networks be understood, because they will condition how a retail access regime would work in practice.

B. TECHNICAL REQUIREMENTS

Two properties of electric network operation need to be understood and taken into account before a coherent model of retail access can be specified. In this section we first characterize the technical issues and then discuss how they affect the implementation of retail access both from the viewpoint of grid operation and customer billing.

Electricity Network Properties

The first property is *limited control capability*. The operator of an electric network is much more circumscribed in the actions he can take to direct flows in an electric network than the corresponding operator in telecommunications or natural gas. There are no switches or valves that can be used to direct power flows. While there are power system control devices, such as phase-shifting transformers, which provide a certain degree of control, the efficacy of such devices is limited. In electricity networks, power flows according to Kirchoff's laws, following paths of least resistance. When there are many generators and demand centers, the interactions among them can either limit or enhance the network flow. Such interactions occur in complex patterns that must be both anticipated and accommodated by operators. When the actions of one entity spill over onto others, we say an externality exists. Decentralizing participation in an electric power network can create externality problems. Network externalities in electricity are a concern both for engineering management under any industry structure and for commercial relations once retail access is contemplated. No such operating problems arise in other network industries.

The second important property of electric network operation is *economic dispatch*. This phenomenon is

due to the variation in the operating cost (and therefore in the value) of different generators. Since the operating costs differ (often substantially) among generators, the network operator has traditionally adjusted the output of different plants by exercising centralized control over operation to minimize overall system operating cost. This process is called economic dispatch. It is a control of network inputs to achieve an overall system economy. No such phenomenon exists in other network industries. From an operating point of view, all telephone calls or natural gas inputs to their respective networks are the same. If the inputs in these other networks need to be rationed or controlled, the reasons involve network congestion (e.g. "busy signals"). In most cases, the network operator is not limiting access because one call, or one shipper's gas, is "less costly" than another.¹ In electricity, the network operator has traditionally performed economic dispatch as part of his function. In a retail access regime, it remains an open question whether the operator will or should continue to play this role.

Grid Operation Under Retail Access

Retail access is based on commercial contracts between a supplier and an end use customer. There are two different ways in which the grid can be operated to satisfy these contracts. They may either be fulfilled by physical performance, or they may be limited to a strictly financial function. Depending upon the choice of contract performance standard there will be different implications for grid operation.

One method of implementation of a retail access regime is to require that the grid operator "dispatch" power contracted under these arrangements by

¹ A network operator may dispatch inputs on the basis of user value by giving them priority in case of congestion, i.e. firm vs. interruptible service, but no rationing of access or service occurs because of cost differences.

operating the seller's generator regardless of other factors. In the wholesale electricity market such "firm scheduling" arrangements are common, and they typically present no physical problem. These arrangements amount to giving a scheduling priority to contracts which guarantees to sellers that the resources they have committed to sell will actually be operated in conformance with contractual requirements.² The only circumstances in which contractual performance cannot be guaranteed occur when there is congestion on the grid.³ Typically, this is not a significant factor, in large part because firm schedules are a small fraction of demand. In the case where firm scheduling requirements become large, there can be significant impacts on grid operation. There has been some experience with this kind of situation in the U.S., in regions such as California and New York, where the amount of non-utility generation (NUG) is large. In these cases, the firm schedules have crowded out lower cost resources because of the scheduling priority that NUGs receive. If retail access develops into a widespread phenomenon, and its firm scheduling requirements get large, similar outcomes may result.

The alternative to the physical performance standard for contracts is a financial standard. In this case, all power flows through a central pooling operation, which is operated on economic dispatch principles. Suppliers bid into the pool and are dispatched if their bid price is below the market clearing price. The pool price may be either the market clearing price or

² Buyers will always be served in a power network operating normally, since demand will draw in power from available generators.

³ Congestion in electricity networks is rather different than congestion in transportation networks. A useful discussion of its implications under retail access is S. Oren, P. Spiller, P. Varaiya and F. Wu, "Nodal Prices and Transmission Rights: A Critical Appraisal," *The Electricity Journal*, v.8, no.3 (1995) 24-35 and related papers cited therein.

an average acquisition cost. In the first case, the commercial contract between buyer and seller can be easily referenced to the pool price. The buyer receives all his requirements directly from the pool and pays the pool price for them. The contract with the seller is at whatever privately agreed price on which the two parties have settled. If the contract price is greater than the pool price, the buyer pays the difference to the seller, and conversely if the pool price exceeds the contract price. This arrangement is known as a "contract for differences" in the U.K., where the practice originated. Contracts for differences (CfDs) are an acceptable performance standard in electricity because the product is homogeneous. End users do not need the particular electricity produced by the seller with whom they have contracted. The same is true in the natural gas industry. In telecommunications, however, specific performance is required because one call is not a substitute for another.

End Use Measurement and Customer Billing Under Retail Access

Electricity flows in large complex networks and cannot be easily isolated into packages for delivery to specific customers as in telecommunications networks. Instead, all power intermingles. To implement retail access, therefore, sophisticated metering must be installed to measure the customer's demand precisely. Otherwise it can't be determined if the actual demand matched the contract specifications. The metering requirements for retail access are much more precise than current procedures. The costs of implementing this metering for small customers may be so high that these customers are effectively precluded from participating.

The main technical reason for the additional metering requirement is that the attributes of electricity supply are complex. In addition to "raw" electric energy, a variety of "ancillary services" are

needed to provide network reliability. The vertically integrated firm supplies these as a bundled product. In a retail access setting, these services need precise definition and measurement. There will be significant transaction costs in both the measuring and the unbundling of these services. The commercial requirement for metering is to charge for discrepancies between contract demands and actual demands. In the gas industry, this is referred to as imbalances pricing.

It is always possible to approximate the demands of precise metering to varying degrees. This is common practice in the case of vertical integration, where ancillary services, for instance, are only taken into account on a partial basis for some large customers. The most common example of this is "power factor" provisions in tariffs for large customers which account for voltage support requirements associated with certain types of demand. Residential customers are not even metered for peak demands, only for total energy consumption. The consequence of billing approximations is cross-subsidization. Inevitably some users will get better service than they pay for and some will get poorer service. Without precise metering, it is impossible to know exactly, or even very approximately, which customers are benefiting and which are over-paying.

C. DEVELOPMENTS ELSEWHERE AND THEIR RELEVANCE TO ONTARIO

Retail access has been implemented only on a limited basis in a few jurisdictions. In this section we survey this experience briefly and draw lessons from it for the conditions in Ontario. A key issue in the implementation of the retail access model is the structural organization of the electricity industry associated with the various experiments.

Retail Access with Vertical Separation

The best known experiment in retail access is the electricity restructuring in the United Kingdom. The Central Electricity Generating Board, which had been the monopoly generator and owner of the transmission network was broken up in 1990 into a transmission company and three generating companies, two of which have been privatized. The basic grid model adopted in the U.K. is the central pooling institution, with all sellers receiving the market clearing price, and all buyers paying this price plus a charge for network costs (the "uplift") and a charge to finance uneconomic costs associated primarily with nuclear power liabilities (the "fossil fuel levy"). Direct access has been phased in for large customers. Small customers continue to purchase through regional distribution companies, which were also privatized at the time of restructuring.⁴ These companies will lose their franchise in 1998 when all customers will be free to contract with any supplier. Despite considerable gains in efficiency resulting from the restructuring, however, consumers have seen relatively little direct benefit. Most of the benefit has gone to the shareholders of the privatized companies.⁵

Another well-known example of retail access is the electricity industry in Norway. In this case, the vertical structure was also deintegrated into a grid company and a number of generators, but no privatization occurred. The grid dispatches contracts

⁴ Similar models have been adopted in Chile and Argentina, see S. Bernstein, "Competition, Marginal Cost Tariffs and Spot Pricing in the Chilean Electric Power Sector," *Energy Policy*, 16:4 (1988) 369-377 and I. Perez Arriaga, The Organisation and Operation of the Electricity Supply Industry in Argentina, Energy Economic Engineering Ltd., 1994.

⁵ See George Yarrow, "Power Sector Reform in Europe with Special Reference to Britain and Norway," paper presented to the American Economic Association, January, 1995.

between sellers and buyers, a large number of which are distribution companies of various sizes. There is also a pool to meet the demands of other customers and to handle short term needs beyond contracted quantities. Although all customers have retail access in principle, in practice, small users have been slow to participate. A major factor had been high costs for metering technology. The metering standard in Norway is hourly measurement. For small customers, the sellers typically adopt standard profiles of behaviour. Under these conditions, the costs of metering have decreased dramatically recently.⁶ The hourly standard of measurement is itself an approximation that suppresses fluctuations which occur more frequently. It is unknown how good or bad this approximation is. There is no stranded cost problem in Norway, since the system is almost entirely hydro based. Therefore there is no policy imperative to address price discrimination in the recovery of uneconomic investment. One goal of the Norwegian reform was to reduce incentives for excess investment. This objective has evidently been achieved.⁷

Retail Access without Vertical Separation

There are several cases where retail access of a kind has been implemented in the U.S. by vertically integrated utilities. These cases are interesting because of the problems they illustrate, rather than any claims they might offer as models to be adopted.

The Bonneville Power Administration (BPA), a government owned utility operating in the Pacific

⁶ This issue is discussed in J. Moen, "Regulation and Competition Without Privatization: Experiences from the Norwegian Electric Supply Industry," Norwegian Water Resources and Energy Administration, August, 1995. Moen indicates that the metering cost has declined from NOK 4000 to NOK 200.

⁷ See Moen, *op. cit.*, p.17.

Northwest region has a small number of customers, known as the direct service industries (DSIs), that are retail customers. BPA also supplies a large number of distribution companies in its region. Its situation has strong similarities to Ontario Hydro. In 1995, the DSI contracts with BPA expired and they were free to contract with other suppliers in the region. BPA offered to exempt the DSIs from stranded investment cost recovery charges if they would sign five year contracts for at least 80% of their demand.⁸ Like many U.S. utilities, BPA has substantial uneconomic assets associated with nuclear power plant investments. In addition, BPA has environmental mitigation liabilities in excess of \$4 billion. To retain the elastic demands of the DSIs, BPA has shifted responsibility for these system wide costs to those customers who do not have retail access. This kind of pricing response is to be expected when some customers have retail access and some, either by legal restrictions or high transactions costs, do not.

An unusual case of retail electricity competition is occurring in the city of Cleveland, Ohio. Here a municipal distribution company is competing with the local vertically integrated investor-owned utility for retail customers by constructing a competing set of wires. This case differs from the retail access model, where only a single set of wires exists. Nonetheless, the distribution company can only deliver power to its customers if it receives transmission service from its competitor. So the access problem occurs at wholesale in this case. The distribution company is legally entitled to preferential transmission service (a unique case where the standard is higher than the recently mandated national standard in the U.S. of "comparable" service). Despite this legal obligation,

an access dispute arose between the two parties that was associated with an emergency incident which occurred in the network during June, 1994. The result of this dispute was some service interruptions on both systems and extensive litigation. The litigation involves disagreements concerning the respective rights and obligations of the parties, and even disagreements over matters of fact.⁹ The importance of this episode is that it illustrates the difficulties of enforcing an access regime when the party who is obligated to provide access is competing with the entity requesting service. This experience is relevant to the proposed convergence model discussed below in Section IV. Because of the conflict of interest problem that arises when vertically integrated firms provide access at wholesale or retail, there have been calls for an independent system operator to implement transmission access for wholesale competition in the U.S. market.

D. CONSEQUENCES OF RETAIL ACCESS IN THE ONTARIO SYSTEM

The highly leveraged financial position of Ontario Hydro creates significant risks. Any near term experiments to implement retail competition threaten financial stability. The risks facing the province will be managed at least cost if all consumers bear them equally. By allowing a few customers to experiment with retail competition, there will be a net transfer of risk to the customers who do not participate. The example of the Bonneville Power Administration in the U.S. illustrates this point. This approach is neither equitable nor efficient.

Reducing the debt to manageable levels should be among the highest priority goals of structural

⁸ See Bonneville Power Administration, "More industries stay with BPA," November 6, 1995.

⁹ See Cleveland Electric Illuminating v. City of Cleveland, FERC Docket Nos. EL94-75-000, EL94-80-000, EL94-86-000, 1995.

reform. The financial impacts of a default on Ontario Hydro's debt will be greater than the costs of stranded asset recovery through electricity rates. If the provincial government is called upon to meet its guarantee obligation on the Ontario Hydro bonds, the consequences will be both higher taxes to pay the Ontario Hydro debt and higher financing costs on the entire provincial debt. No one today expects such a default. Therefore, the interest rates that the province pays on its own, i.e. non-Hydro debt, reflect that expectation. If expectations change, and the financial markets perceive that the guarantee obligation will be called upon, the province will pay higher interest rates. In the event of a bond default by Ontario Hydro, there will almost certainly be a down grading of provincial debt and a corresponding increase in on-going financing costs. It is possible that this could occur even if the markets only come to believe that the possibility of a default has increased. Therefore, it is important that the electricity sector maintain financial stability by limiting open competition in the near term.

Many competition scenarios can induce problems. Given the gap between current rates and opportunity costs, the incentives for uneconomic bypass for some large industrial customers and some municipalities

are strong. The agreement between Ontario Hydro and the MEUs concerning non-utility generation (NUG) development¹⁰ is a constructive effort to manage excess capacity. Differences over structural reform should not be allowed to threaten that equilibrium. It must also be recognized that experiments with broadening the market in Ontario by allowing bids from U.S. suppliers may be destabilizing. Once a single U.S. supplier is allowed into the Ontario market, there will be no legitimate reason to deny access to others. Moreover, there is no reason to believe that access to the U.S. market would automatically follow from opening the Ontario market.

¹⁰ See "Amended Report: Task Force on Municipal Electric Utilities Purchasing/Developing Non-Utility Generation," February, 1993.

III. POOL PURCHASER MODEL

A. DEFINITION

The pool purchaser model is based on forming a separate transmission company from the current assets of Ontario Hydro, empowering that company to purchase from all provincial generators in a least cost fashion, and controlling the entry of new suppliers until such time as the current excess capacity is reduced. All power in the province would be sold by the pooling and transmission entity to distribution companies.

The pool purchaser model is designed to manage wholesale competition. To achieve the benefits of competition, the generation assets of Ontario Hydro should be horizontally deintegrated. They will compete among themselves and with existing non-utility generators (NUGs). The pooling entity will be the single purchaser in both the short run operation of the system and in the long run, when it will manage the acquisition of new resources when they are required.

Obligation to serve will devolve to distribution companies (Discos). Discos will either take responsibility for their own load forecast, or may exercise the option to pool risk with other Discos and delegate to the transmission and pooling entity the responsibility for both load forecasting and acquiring resources to meet those requirements.

B. REQUIREMENTS

There are two kinds of requirements for implementing the pool purchaser model: structural changes to Ontario Hydro and the creation of a regulatory system. These are related issues (the kind of regulation required depends upon the structure created) but they can be addressed separately.

Questions involving ownership issues (including privatization options) are not addressed here. The requirements of the pool purchaser model are largely independent of ownership.

Structure

The separation of Ontario Hydro's transmission assets from generation and distribution is the most basic and important step in implementing the pool purchaser model. This involves the creation of a new company that will own and operate the network and be the market maker. This company must have operating procedures and tariffs that provide non-discriminatory access for generators, provide for economic dispatch and meet reliability requirements in the least cost fashion.

To facilitate competition for sale to the pool purchaser in the short run, some restructuring of generation assets will be required. The generation business units of Ontario Hydro should be deintegrated. There does not appear to be any compelling case to keep the current business unit structure, i.e. nuclear, fossil and hydroelectric, integrated in one corporation. It is less clear whether deintegration beyond the current business unit level would be desirable. This question will have to be studied. The trade-off involves the potential increase in competitive pressure from having more participants versus the potential loss of scale economies in larger organizations. In the case of hydroelectric resources, the output of generators in the same watershed or river basin are interdependent, with the output of downstream units dependent on the water released by upstream units. Therefore, coordination among the hydroelectric units in a watershed or river basin is required to maximize the economic benefit of the river system.

as a whole and manage non-power impacts within a river system.¹¹ This creates economies of scope. Competition may not be feasible in these cases. Similarly in nuclear power, there are potential economies of maintenance planning, fuel cycle management, and information.

The existing NUG contracts may also have to be restructured so that these generators can compete more directly in the short term with the restructured Ontario Hydro generators. To the extent that NUG contracts do not now provide for true variable cost dispatching, they are inefficient, and should be restructured so that uneconomic must-take requirements are eliminated. Restructuring NUG contracts so that they are fully dispatchable can be achieved without imposing economic losses on the owners of these projects.

The development of operational protocols to implement wholesale competition will require that coordination procedures be formalized so that the pooling potential among all provincial generators is realized. There are different ways to organize pooling institutions. Technical issues such as transmission constraints, controls and reliability need to be addressed. Commercial issues must be taken into account, but separated as much as possible from technical issues. The design of transmission pricing is a subject that requires particular attention.

Finally, there are structural issues involving the distribution sector. These are not addressed here, but are discussed in the accompanying MEA document, "A Proactive Process for Restructuring Distribution in Ontario."

¹¹ This issue is discussed in British Columbia Utilities Commission, "The British Columbia Electricity Market Review," September, 1995, p.66.

Regulation

Regulation will be required in the pool purchaser model. The transmission and pooling entity will need oversight in the development of competitive protocols for system operation and the supply of ancillary services. Transmission tariffs will need to be developed and approved by a regulatory body. A generic regulatory issue in the pool purchaser model is defining the boundary between the responsibilities of the pooling and transmission entity and those of the regulatory agency. As a general rule, the regulator should set policy guidelines and articulate the principles on which decisions should be made, and the pooling and transmission entity should be responsible for implementing those policies. In practice there may be some feedback in this process, since technical issues may arise in implementation that were not anticipated in the policy formulation stage.

Entry regulation will also be important. To limit financial risk there needs to be control over uneconomic bypass. A regulator will be required to determine if new capacity additions will be economic, and to establish a framework in which the acquisition of new capacity is managed efficiently. In the case where distributors bear the obligation to forecast loads, their demand profile will determine needs in the first instance. It is likely that these forecasts will be implemented in the form of contracts for specific quantities over specific time horizons. Matching supply bids to the time pattern of forecasted demands will require some analysis of trade-offs among the offers received. A regulatory mechanism must be established to assure that these trade-offs are handled efficiently.

It may also be desirable to have a regulatory test of major capital programs for nuclear units. It is quite probable that some such programs may be required during the period when excess capacity is still a problem. The important social cost question is

whether it is cheaper to pay the costs of maintaining nuclear production, or to retire the unit in question. A self-interested entity is unlikely to make the best choice, especially if its management believes that customers will underwrite the cost of mistakes.

Designing regulatory institutions is not simple. It is desirable that these institutions have transparent processes. The information requirements of regulation can be great, and the ability of regulators to acquire the appropriate information is limited. Therefore a structure which produces the high quality information required for efficient regulation is valuable. A structure with many participants is more likely to result in this outcome than one with fewer participants.

C. ANALOGIES WITH OTHER JURISDICTIONS

The pool purchaser model has been adopted in a number of other settings. The case that is closest to the model proposed by the MEA is the electricity system in Spain. The recent electricity reforms in Alberta also have some similarities, particularly with respect to pooling. For new capacity, the regime under which utilities in the U.S. purchase from independent power producers also resembles the pool purchaser model.

In the case of Spain, the pooling and transmission entity was originally created in 1985 to integrate the generation of the several producing utilities and to sell to distribution companies at a uniform national tariff. An important element of the pool buyer system is a charge to recover the significant stranded costs of terminated nuclear power plants. Other aspects of the Spanish regulatory system are related to the institutional structure of the industry where different firms have very different resource endowments. There is a complex system of transfers which addresses these questions. Recently, as part of electricity legislation enacted in 1994, a regulatory

commission has been created to replace direct government control of the transmission and pooling company and to establish competitive bidding procedures for new generation. When new generation capacity is required, it will be acquired on a national basis. Bidders will include both existing Spanish utilities, independent power producers, and other European utilities. The new electricity law also includes provisions for potential retail access, but only under circumstances that do not impose costs on the national system, i.e. all other customers. It is uncertain whether there will be any participants in this "independent" regime, since the costs of participation have yet to be specified.¹²

The structural reforms to the electricity industry being implemented in Alberta under the legislative authority of the Electric Utilities Act of 1995 involve a single purchaser pool that will coordinate economic dispatch.¹³ The pool builds on previous experience in the province with pooling, but there will be changes in pricing, structure, and access by sellers. There is no stranded cost problem in Alberta, indeed the cost of power currently in Alberta is below the level expected for new generation. This means that demands for retail access have been fairly muted, since large price-sensitive customers do not have a strong motive to seek alternative suppliers. The pool purchaser model in Alberta does not extend, however, to new capacity. There is nothing in the new legislation which addresses the question of entry regulation. If distribution companies finance new entry through

¹² See E. Kahn, "The Electricity Industry in Spain," University of California Energy Institute working paper PWP-32, August, 1995.

¹³ For a general discussion see Alberta Department of Energy (ADOE) 1994. "Enhancing the Alberta Advantage: A Comprehensive Approach to the Electric Industry."

long term contracts, those costs may be subject to regulatory review. It is unclear as yet what such a process would be like. To date, the newly formed Grid Company of Alberta has filed a transmission tariff with the Alberta Energy and Utilities Board.

The pool purchaser model has been used in the U.S. in the market for private power generation. This market was originally created by federal legislation mandating that vertically integrated utilities purchase power from certain types of non-utility generators. As the market developed it evolved into a competitive process where utilities evaluated bids for long term power purchase contracts along a number of different dimensions to determine which projects brought the most value. This system has inherent limitations due to the conflict of interest that the utility has in its role as purchasing agent and its role as generation developer. As private power expanded in scope and market share, it tended to crowd out new utility investment in generation. No very good solution exists for regulating the dual roles for the vertically integrated utility. For this reason, the structural separation recommended by the MEA model is a more appropriate implementation of the pool purchaser approach than the U.S. experience under vertical integration.

D. BENEFITS

Separation of the transmission company and the formation of a pooling entity (the single purchaser) are prerequisites to implementing wholesale competition. Without them the problems of self-dealing over transmission access and capacity expansion can never be adequately solved. Absent divestiture, proposed regulatory approaches to equal market access are unlikely to be effective. Retaining corporate affiliation between generators and the network/market entities leaves conflicts of interest unresolved. Any oversight agency faces severe information limits in attempting to police self-dealing, since such enforcement essentially depends

upon requiring the discriminating agency to incriminate itself. Structural separation increases transparency and accountability.

Competition among provincial generators will be encouraged by the pool purchaser model. Divestiture of the transmission network will provide unbiased access. Horizontal deintegration of Ontario Hydro's generation business units will facilitate competition within a pool purchaser framework. It may be necessary to examine the contractual relations with NUGs to determine if they are appropriately structured for economic dispatch. A pool market based on economic dispatch will result in greater efficiency than a retail access regime in which many specific performance contracts must be dispatched with higher scheduling priority than other resources. Competition will also extend to long run expansion of the system, when new capacity is required. The pool purchaser will solicit bids to meet forecasted demand, and select that which provides most value.

The wholesale competition approach of the pool purchaser model avoids the irreversible steps that retail access involves. Once retail access is provided, it will prove extremely difficult to revoke. Commercial contracts would have to be broken. Compensation schemes would have to be devised and financed. Before taking the step to retail access, it would be wise to be more certain of its benefits. What is clear, however, are the risks facing the province. Given the current debt burdens of Ontario Hydro, opening the market could lead either to financial destabilization or radical cost shifting to small customers (or both).

IV. THE CONVERGENCE MODEL

A. DEFINITION

Ontario Hydro has introduced a hybrid approach, which we call the "convergence model," based on the claim that all of the infrastructure industries, electricity, gas, information, water and municipal services, are moving together, i.e. converging, toward a new form of customer service (Ontario Hydro, "Competition, Convergence and Customer Choice," September 30, 1995). In this section we characterize this model, as outlined by Ontario Hydro, and the practical policy recommendations that follow from accepting its claims.

The convergence model is a variant of the retail access model discussed in Section II above. The principle difference is that Ontario Hydro does not propose divestiture of the transmission network. It argues that corporate disaggregation ("a multi-business model with separate governance") is sufficient to "create commercial and arm's-length relationships between the various parts of Hydro" (p.43). By limiting reorganization in this way, Hydro retains "the potential for reintegration," which it believes will be important for the development of a converged services delivery industry. This reintegration option is strongly tied to the free partnering opportunities that Ontario Hydro sees as a necessary step toward the customer driven industry of the future.

The technical and commercial features of the convergence model are not clearly specified. The vision of multiple providers of multiple infrastructure services has a vague, almost science fiction quality. The features of this approach are best understood through its implications, particularly for competition in the markets addressed.

B. COMPETITION ANALYSIS

Although the technological drivers and characteristics of the convergence model are not particularly well specified, the model does raise important questions about the role of competition. In this section, the competition between electric utilities and other service providers is first addressed. The goal of this discussion is to assess the risks of competing in these markets and some of the driving forces for eventual success. Secondly, the specific Ontario Hydro proposal also has competitive impacts on the provincial electricity industry. These are also assessed.

Competition with other service providers

If the convergence model is a technologically driven inevitability, then there are other industries currently providing infrastructure services that will compete with Ontario Hydro to perform these functions. It is important to understand who these other competitors are and how an electric utility might participate in the markets that they currently serve. A particularly important sector where convergence might occur involves the "information highway." The issues associated with electric utility participation in these markets were addressed recently in a major study conducted by the U.S. Electric Power Research Institute (EPRI).¹⁴ The principal findings of this study are summarized below.

The EPRI report reviews six different suppliers of information services in the market today, describes their technology, assesses its evolution and addresses

¹⁴ "Business Opportunities and Risks for Electric Utilities in the National Information Infrastructure," EPRI Project TR-104539, Preliminary Report, October, 1994.

which electric utility assets could be deployed in these businesses. The six providers reviewed are: local exchange carriers (LECs), cellular systems, cable television (CATV), competitive access providers (CAPs), point to point circuits, interexchange carriers (IXCs), and satellite networks. Three classes of utility assets turn out to be deployable as part of these systems. These are: (1) existing utility owned fiber optic cable with excess capacity, (2) point to point contact with customers, and (3) rights of way. Of these three, it is the availability of excess fiber optic cable that presents the near term opportunity for partnership with existing market participants. In every case examined in the EPRI report, the potential role for electric utilities is as a small niche participant, providing inputs at potentially lower cost than other suppliers.

The information services industry has certain features which are potential opportunities for electric utilities, but also pose significant business risks. The main opportunity, which Ontario Hydro has identified, is the chance to sell energy services to consumers. A key conclusion of the EPRI report is that network providers will only profit if they provide services in addition to just network capability. It is by no means certain, however, that any particular utility knows precisely what services, which do not now exist, will be the ones to attract customers. Perhaps more important than this customer preference uncertainty is the very large technology risk inherent in the information industry. It is precisely the technological dynamism that creates the possibility of convergence which also means that any investment faces very serious risk of obsolescence. The information technology product life cycles in the recent past have been on the order of a few years. Ontario Hydro acknowledges both the consumer preference uncertainty and the technological risks ("Competition, Convergence and Customer Choice," p.30). Despite acknowledging these, they still endorse their convergence strategy.

It is not obvious, however, that participants in the electricity industry, where asset lifetimes have traditionally been on the order of decades and forecasts of consumer behaviour have been frequently inaccurate, can adjust and prosper in a marketplace so fundamentally more dynamic than the traditional utility industry.

Competitive impacts on electricity

Ontario Hydro addresses the competitive impact of its convergence strategy by arguing two points. First, by offering retail access to customers, they will have a choice. Access to customers will be made available for competing suppliers at regulated prices. Second, even though Ontario Hydro proposes to retain ownership of all its generation assets, electricity suppliers in the Northeastern U.S. will be able to compete through the 4000 MW of physical interconnections. These two points are made to argue that the market will be competitive in principle.

These arguments are not convincing. If, in fact, non-discriminatory access were truly available to competing suppliers, it is not obvious why Ontario Hydro would need to, or even want to, retain control and ownership of the network. The only value of the network to an owner of generation assets is the ability to exert market power by limiting competition. It has been a traditional strategy of network owners in all network industries to use their control as a means of limiting competitive entry. An important property of technological convergence in digital communications networks is that control is essentially shared, and therefore ceases to be an entry barrier.¹⁵ Therefore, either true convergence would eliminate the value of

¹⁵ This point is made by R. Solomon, "Telecommunications Technology in the Twenty-First Century," in *The New Information Infrastructure: Strategies for U.S. Policy*, ed. W. Drake, New York: The Twentieth Century Fund Press, 1995.

vertical ties between generation and transmission, or if there is still value to such ties, it must lie in the ability to foreclose competition.

There is reason to be skeptical of the broad convergence claim on technical grounds. While digitally switched networks definitely show evidence of convergence, it is much less clear that this technological trend extends to electric power networks, at least for the next decade. The electrical network properties discussed in Section II. B. above, relative lack of control and economic dispatch value, are quite different from the characteristics of networks in the information industry. To the extent that power networks become more dominated by digital control, there will be some convergence. The development of digital control of power networks is still in its early stages, with a few demonstration projects in place and a number of feasibility studies conducted by major vendors.¹⁶ Undoubtedly this research and development work will continue. But its rapid deployment must be considered more of a long term prospect (more than ten years) than a near term prospect (within five years). Because of the electrical interconnections in the Northeastern U.S. and Ontario, there will only be effective network control when digital technology is widely adopted. Even when this occurs, the economics of power generation will favour some kind of economic

dispatch. For these reasons, the convergence of electricity networks to the information network model is questionable in the near to intermediate term.

Given the remote near term prospects for technological convergence, the Ontario Hydro retail access proposal must be viewed skeptically as an effort to maintain network dominance while offering the appearance of open access. It is not at all clear how regulation could possibly function under the proposal of Ontario Hydro. The access services promised to others would have to be provided at regulated prices. The energy and other services delivered over the wires would be competitive and unregulated. How would the costs of these separate businesses be separated? How would a regulator know that the regulated side was not subsidizing the unregulated side? Wouldn't Ontario Hydro want to overprice access for others, so that it could underprice the unregulated services business?

C. ASSESSMENT

The convergence model rests upon a number of unproven and uncertain assumptions. Pursuing this strategy may be a reasonable business strategy for a firm with sufficient equity capital to sustain the business fluctuations and risks that it entails. It is not an appropriate strategy for a debt burdened provincial entity such as Ontario Hydro that has had its previous investments underwritten by government guarantees. Ontario Hydro management appears to believe that the convergence model represents the best business strategy for the future. It is not appropriate, however, to pursue this model in the context of a company that has provincial government guarantees regarding finance and a dominant market position.

The Ontario Hydro management may wish to pursue the convergence model in the context of a successor

¹⁶ For general studies see Power Technologies Inc., Flexible ac Transmission Systems (FACTS): Scoping Study Vol. 1, Part 1: Analytical Studies, EPRI EL-6943, August, 1990 and General Electric Company, Flexible ac Transmission Systems (FACTS): Scoping Study Vol. 2, Part 1: Analytical Studies, EPRI EL-6943, September, 1991. The demonstration project sponsored by the Bonneville Power Administration is described in J. Urbanek, et al, "Thyristor Controlled Series Compensation Prototype Installation at the Slatt 500 kV Substation," *IEEE Transactions on Power Delivery*, v. 8, no.3 (1993) 1460-1469. Studies related to a project proposed in New York state are described in K. Clark et al, "Thyristor Controlled Series Compensation Application Study - Control Interaction Considerations," *IEEE Transactions on Power Delivery*, v. 10, no.2 (1993) 1031-1037.

company that has no government financial guarantees and does not have a dominant market position. In light of the financial risks that would accrue to the province entailed by the convergence strategy, it would be more appropriate that it be tested first and then pursued by some organization other than a franchised monopoly. In all likelihood,

a successor company of this kind would require private capital to underwrite the risks that this strategy involves. If Ontario Hydro cannot pursue the convergence strategy under these safeguards, then it is too risky and requires too much anti-competitive use of market power.

V. CONCLUSION

The retail access model is inappropriate for the conditions facing the Ontario electricity industry today. At best, retail access would provide unequal benefits to consumers, favouring the interests of large price-sensitive users, and shifting the burden of stranded cost recovery to small users. At worst, it would reduce the efficiency of system dispatch, destabilize the amortization of the Ontario Hydro debt as well as discriminate against small customers. The convergence model variant would only achieve its commercial objectives if it is either anti-competitive or if Ontario Hydro manages to win some unclearly specified technology wager.

By contrast, the pool purchaser model introduces competitive forces at the generation level. It provides the opportunity to gain experience with more decentralization in the electricity industry, while still preserving customer equity. The regulatory structure

required in this approach will help improve transparency and accountability. Given the very real costs of mismanaging the Ontario Hydro debt, the pool purchaser model meets the needs of the industry and the province at least cost and risk.



Municipal Electric Association

**DEVELOPMENTS IN
OTHER JURISDICTIONS**

Submission to the
**ADVISORY COMMITTEE ON COMPETITION
IN
ONTARIO'S ELECTRICITY SYSTEM**

DEVELOPMENTS IN OTHER JURISDICTIONS

INTRODUCTION

This document briefly surveys recent developments in a number of jurisdictions in North America, Europe, as well as Australia and New Zealand. It should be noted that a significant number of countries have eschewed major electricity industry restructuring of the kind being considered here; among them are such major economic powers as France and Japan.

Where restructuring is taking place, the general trends are towards increased competition in generation, unbundling of generation from transmission and distribution, and the creation of a pool. Despite all the initial enthusiasm for retail access, it has either been rejected or put off in most jurisdictions. In a few jurisdictions, it has been introduced only partially with no beneficial impacts, (and indeed some adverse ones) on most customers.

CANADA

ALBERTA

Alberta is served by three large, vertically integrated utilities, each having its own service area. There are also several distribution utilities buying power from TransAlta (one of the large utilities) and distributing it within municipal boundaries. Since 1982 the costs of generation and transmission of the three integrated utilities have been averaged under the Electric Energy Marketing Act, thus permitting all customers to benefit from the low cost sources of supply. Since new sources of supply are likely to be more expensive than current supply, there have been efforts to preserve these historic benefits for *existing* customers. The Electric Utilities Act was passed in

June 1995. Implementation is to begin in January 1996. Elements of the new system are as follows:

Structure / Competition

- generation is obtained on a competitive basis; competitive process for new supply;
- single transmission system;
- power pool: generators offer all power into the pool, distributors acquire all power from pool, pool acts as hourly 'spot market';
- Alberta has not had a stranded assets problem;

Retail Access

- retail access rejected;
- customers buy from owner of distribution system;

Ownership

- restricted municipal ownership of generation capacity;
- no requirements for divestiture;
- multi-party ownership of transmission grid;
- continued private / public mix;

Regulation

- Public Utilities Board approves tariffs, price hedging contracts;
- Electric Transmission Council oversees transmission system;
- Power Pool Council formed to administer pool (responsibilities include dispatch order, financial settlement, setting of charges);
- distributors and the Transmission Administrator pay a share of annual fixed costs of generation;
- distributors maintain portfolio of pricing arrangements to manage costs;
- 'postage stamp' rates for distribution systems;

- 'location based' rates for new generation;
- incentive regulation.

Impacts

- no immediate impact on rates; downward pressure expected over longer term because of increased competition, incentives for efficiency, lower regulatory costs;
- benefits and costs of existing generation continue to be shared province-wide;
- transmission costs shared province-wide.

BRITISH COLUMBIA

During 1995, the British Columbia Utilities Commission (BCUC), under direction from the provincial government, undertook a public review of the provincial electricity industry. A report containing recommendations was submitted to the government in September 1995 and further public comments on the report were received in October. The government has said it will develop policy on electricity market structures by early 1996. A synopsis of recommendations by the Commission is as follows:

Retail Access

- retail access rejected

Short-term:

- require electric utilities owning generation and transmission assets to establish separate operating divisions with elimination of cross-subsidies;
- require transmission-owning utilities to submit wholesale transmission service tariff applications to the BCUC;
- develop a real time pricing tariff option;
- continued entitlement of consumers to low embedded-cost provincial generation facilities.

Medium-term:

- electric utilities to transfer generation assets into separate corporate entities;
- establish a process for determining design of entitlement contracts and horizontal de-integration in generation;
- establish a process for determining design of a Wholesale Poolco model.

UNITED STATES

CALIFORNIA

High rates in California (50% higher than the U.S. national average) have sparked a fierce debate in the electricity industry which has gone on for several years. Extensive hearings have been held before the California Public Utilities Commission (CPUC).

After a number of interim reports, in December 1995, the CPUC issued a final decision on restructuring, details of which follow:

Structure / Competition

- transition to a competitive market would begin in January 1998;
- transmission would be controlled and operated by an Independent System Operator (ISO);
- an independent Power Exchange (Exchange) would operate as a voluntary wholesale power pool;
- utilities would continue to have direct control and operation of their distribution system, power production and procurement of generation services for their customers;
- a non-bypassable 'competition transition' charge would be implemented to cover retail transition costs;
- the CPUC recommends a minimum renewables purchase requirement;

- the Legislature is advised to adopt a non-bypassable 'public goods' charge on retail sales to fund research, development, demonstration and energy efficiency programs, and a non-bypassable surcharge to fund low-income rate assistance.

Retail Access

- full retail access put off until 2003;
- major technical problems remain as obstacles to implementation at small business and residential level;

Ownership

- utilities would continue to own, but not operate their transmission facilities;
- the ISO would have no financial interest in the source of generation;
- it is anticipated that market power problems will require existing IOUs to divest themselves of a substantial portion of their generating assets.

Regulation

- the new market structure will require the agreement of the Legislature and the Federal Energy Review Commission (FERC);
- the ISO and Exchange would be separate entities under FERC jurisdiction;
- utilities would be obligated to provide distribution service to all customers;
- the CPUC would regulate the rates for utility services not subject to competition, using performance-based regulation;
- the CPUC will conduct an environmental impact assessment of this and alternative policies.

Impacts

- under performance-based regulation, utilities will face greater operational flexibility and shareholders will face greater risk;
- performance-based regulation is expected to improve service quality and encourage innovation;

- the ISO would increase efficiency by combining functions of 3 separate utilities.

CONNECTICUT

The Legislature is studying recommendations on restructuring from the Department of Public Utility Control (DPUC). A legislative task force will issue its final report in early 1997. The DPUC has made the following recommendations:

Structure

- the objective is to introduce competition;
- issues of strandable costs and service reliability must be addressed before restructuring can be considered;
- generation is not a natural monopoly and may be competitive with proper safeguards;
- an independent operator, such as the New England Power Pool (NEPOOL), should control dispatch, the use of the grid and maintain reliability;
- a pool should have separate status in the structure; it should own no generation, transmission or distribution company assets, nor should it be owned by any of those entities;
- utilities should be able to recover net, non-mitigatable, stranded investment through an unavoidable charge;
- the quest for inexpensive energy should not compromise environmental objectives.

Retail Access

- retail access not being considered until after restructuring has been addressed;

Ownership

- utilities should not be required to divest themselves of generation but affiliate transactions need oversight;
- transmission and distribution entities should retain exclusive franchise rights;

Regulation

- transmission and distribution should be regulated;
- performance-based regulation should be favoured over rate-of-return regulation.

MASSACHUSETTS

In New England, utility load forecasts have turned out to be high and the recent addition of new power plants to the existing stock of older facilities has led to surplus capacity in the region. Massachusetts has some of the highest electric rates in the nation.

In February 1995, the Department of Public Utilities (DPU) began investigating industry restructuring, with the aim of minimizing costs for all customers. In August 1995, the DPU approved a restructuring order whose principles include:

- functional separation of generation, transmission and distribution;
- ensuring a competitive generation market;
- furthering the goals of environmental regulation (e.g. through DSM);
- providing universal service;
- unbundled rates;
- opportunity for stranded cost recovery;

Retail Access

- retail access not being considered until after submissions by industry stakeholders;

Interested parties are required to submit restructuring proposals consistent with these guidelines by August 1996.

NEW HAMPSHIRE

New Hampshire has amongst the highest electric rates in the U.S. As a result, it is considering a pilot project to test retail wheeling. In 1996 the State Legislature will consider a Bill to establish a legislative oversight committee on restructuring which would report by November 1996. All electric utilities would be required to submit rate restructuring plans. Proposed restructuring principles are as follows:

Structure / Competition

- move to a competitive generation market;
- unbundled charges for generation, transmission, distribution and ancillary services;

Retail Access

- small-scale experiments with retail access continue;

Regulation

- incentive regulation in transmission and distribution systems;
- distributing utility to have obligation to serve all customers within service territory;
- priorities of environmental protection and long-term environmental sustainability through market-driven rather than regulatory approaches.

NEW YORK

In 1993 the New York State Public Service Commission initiated the 'Competitive Opportunities' process in order to plan for competition. Over 90 parties have participated. Principles to guide the transition were adopted in June 1995, and various models have been proposed. A recommendation has been made to the Commission, which is expected to release a decision in 1996, after further consultation.

The principle drivers are lower prices and improved service. The recommendations follow:

Structure / Competition

- separate generation from transmission and distribution;
- competition in generation;
- independent transmission system operator;
- competition between energy service companies.

Retail Access

- retail access would be considered only "if that is consistent with desires of customers, after considering input from all segments of the customer base";

Regulation

- less regulation;
- transmission and distribution companies retain obligation to serve;
- performance-based regulation for monopolistic functions.

WISCONSIN

Wisconsin utilities produce some of the lowest-cost electricity in the American Midwest. With the stated aim of ensuring the state retain its competitive edge, the Public Service Commission of Wisconsin (PSCW) opened a docket on industry restructuring in September 1994 and invited comments. In December 1995 the PSCW issued a final proposal. It does not plan to call for any legislation to implement the plan until it establishes some of the plan's consumer safeguards.

- 1996 - each investor-owned and municipal utility should propose a plan for establishing functionally segmented business units for generation, transmission, distribution and energy services;

- 1996 - an independent system operator (ISO) must be established which operates a non-preferential transmission system on a state-wide or regional basis; if the ISO is not successful, the PSCW will establish an independently owned state-wide transmission company;
- 1996-7 the PSCW will examine transmission and generation market power and develop a plan to create workable competition;
- 1997-8 the ISO becomes operational;
- 1998 PSCW studies reliability and system operation issues;
- 1999 PSCW establishes a separate transmission company if necessary;

Retail Access

- retail access not to be considered until after restructuring and it will not be implemented unless it is determined to be in the public interest.

EUROPE

ENGLAND AND WALES

Privatization and major restructuring of the electricity supply industry was first addressed by an all-party Select Committee on Energy in December 1987, with new arrangements coming into place in March 1990. The government's aim was to promote competition, increase efficiency and permit markets to determine matters such as fuel choice and investment. The government also had an ideological predisposition for privatization as well as an interest in reducing union power. Unions (both mining and rail), had previously succeeded in having the state-owned generating company purchase coal from unionized facilities at prices substantially above the market. The restructured system is described below:

Generation

Generation was split into 3 companies and separated from transmission. Two of the companies were privatized, with nuclear generation remaining in the Government's hands (privatization efforts continue). Competition was introduced. The proportion of the market accounted for by the two main fossil fuel generators has declined from nearly 80% to below 60%, but concern about the market power of these two companies has led the regulator to intervene. (The two companies have undertaken to dispose of some of their plant by the end of 1996.) In addition, the regulator has required them to bid into the Pool in such a way as to constrain the average level of Pool prices.

Transmission

A separate transmission company was established, owned jointly by the distributors. The grid is responsible for dispatch and reactive power. A power pool was created to facilitate trading. The transmission business is subject to price controls by the regulator.

Distribution

Twelve distribution networks were privatized, and competition in supply was introduced under a phased timetable.

The distribution business, and that part of the supply market which is not subject to competition, is subject to price controls by the regulator. Distributors have recently been pushing to increase the amount of their own needs they can generate. The regulator is considering such requests.

Regulation

The Office of the Director General of Electricity Supply (OFFER) was set up in 1990 to regulate the industry. There is a Consumers' Committee in each region, administered by OFFER. The regulator

imposes price controls on the transmission and distribution sectors.

There is debate over the issue of who has the obligation to supply, which rests presently with public electricity suppliers, within their areas. It has been suggested that the obligation be shared with other suppliers. The regulator also has certain environmental responsibilities.

There is increasing government concern over vertical reintegration that would result from several recent takeover bids. The Trade and Industry Secretary is conducting a review of two bids where generators with considerable market share are proposing to buy distributors.

Retail Access

- although the United Kingdom underwent the most radical restructuring program, retail access is unavailable to most small customers and its full implementation remains in question.

Impacts and Lessons Learned

A number of important lessons have been learned from the U.K. experiment:

- Far too much market power is present with only 3 large generating companies. Greater competition would have been induced had a larger number of generators been created.
- Private ownership of transmission, distribution and generation, even if it is separated initially, creates pressures for re-integration (as is now occurring).
- The industry was privatized at prices that were far too low, as evidenced by subsequent growth in share prices. Better evaluation of market value could have been attained through an advance issue of a modest number of futures.

- Yardstick regulation of a small number of distributors is difficult because of the absence of a sound statistical basis for comparison. Most profits have been earned by the distributors, who now face much more stringent regulation.
- As a result of the way the restructuring was performed, the main beneficiaries thus far have been shareholders and not rate-payers.

NORWAY

Norway is an electricity-intensive country. Demand is extremely seasonal, fluctuating between 19.3 GW in winter and 9 GW in summer. There is little growth in demand and little expansion of capacity because of a current surplus. Production is 99.6% hydro-power. In 1990 the Norwegian government, by means of the Energy Act, restructured the industry to meet the following objectives:

- separation of market-oriented functions from natural monopolies;
- equalization of prices across regions (to the extent that different prices are not supported by different transmission costs);
- better exploitation of fluctuations in hydro-power potential;
- improvement in efficiency in generation, transmission and distribution;
- better price signals to consumers in order to use energy more efficiently;
- profit-motivated investment incentives.

Structure

- approximately 60% of energy is supplied by vertically integrated companies;
- there are approximately 60 generating utilities (33 of which own 96% of capacity);
- the state-owned generation and transmission company was separated into two companies;

- there are approximately 240 distributing utilities;
- the public-sector transmission system operator is responsible for balancing supply and demand;
- a state-owned subsidiary has responsibility for power exchange;
- over 80% electricity is supplied under firm contracts.

Ownership

- ownership of generation capacity is approximately 15% private, 56% municipal and 29% state;
- there has been no privatization of any existing utilities.

Regulation

- transmission and distribution are subject to regulation;
- generation and supply are unregulated and open to competition;
- monopoly franchises have been withdrawn;
- transmission system operator has access to utility production plans and demand forecasts;
- traders and brokers operate freely under licence;
- brokers have no supply obligations;
- traders and utilities have supply obligations;
- distribution utilities initially required to adopt and practice integrated resource planning (IRP) to promote energy efficiency;
- state-owned companies' debts are guaranteed by State;
- right of non-public entities to exploit watercourses is subject to government licence.

Retail Access

- in theory, retail access is available; however, most retail customers are large users;

Recent Developments

- regulatory agencies are currently working on a plan to introduce price-cap regulation combined with yardstick competition at the distribution level;
- consolidation among generation and distribution companies has raised the concern that generation-related costs are being sheltered in distribution accounts, which have a greater degree of protection;
- significant exports of firm power over a long period are not wanted by the government because of energy security and environmental concerns; the government prefers exchanges: exports of peak power and imports of non-peak power; exchanges may help absorb the surplus and encourage greater end-use efficiency;
- the requirement to implement the basic elements of integrated resource planning was dropped in 1994 because of the inconsistency between such requirements and operation within a competitive retail market.

AUSTRALIA

VICTORIA

Reform began in 1993 and is scheduled to continue until 2000. The principal objectives are competition and lower prices:

Structure / Competition

- break up of state, vertically integrated monopoly; separation of transmission and distribution from generation and retail;
- state-owned electric generation split into 4 companies, plus one partly private company;
- state-owned transmission company broken into Power Exchange (VPX) and Power Net (PNV);

- market management company (VPX) controls wholesale spot market, system security and network investment planning;
- state-owned supply company and 11 municipal electric utilities formed into 5 corporatized regional distribution and retail businesses.

Retail Access

- under consideration, but implementation only after industry restructuring;

Ownership

- independent state-owned Power Exchange;
- monopoly state-owned high-voltage transmission grid (Power Net);
- progressive privatization of publicly owned generation and distribution.

Regulation

- independent regulation of transmission and distribution through Office of the Regulator General (ORG);
- 'maximum uniform tariffs' established for transition period;
- distributors obligated to provide to franchise customers;
- strict controls on cross-ownership.

NEW ZEALAND

New Zealand has a highly hydro-dependent electricity system. The government started considering its options for restructuring the electricity industry in early 1988. Initiatives to increase efficiency have included corporatization and the introduction of competition. The industry has been vertically unbundled in order to make it easier for other generators to enter the market.

Generation

The dominant generator, Electricity Corporation of New Zealand (ECNZ) was first corporatized as a government-owned entity and was split last year into two competing state-owned enterprises. Hydraulic generation, which has approximately a 75% market share, has remained in ECNZ. Non-hydro generation has been transferred to a separate entity. The government has recognized that ECNZ could deter new competitors by cross-subsidizing or 'averaging' the price of power between high- and low-cost stations.

Given ECNZ's dominant position in the industry, the government has instituted a set of special restraints which will apply until ECNZ's market share falls below 45%. They are:

- a cap on ECNZ providing new capacity;
- a requirement for ECNZ to 'ring-fence' any new capacity it provides, in order to prevent cross-subsidization;
- a requirement for ECNZ to offer a high level of its firm capacity to customers under long-term contracts; this is designed to prevent ECNZ from manipulating the spot price (known as 'gaming').

Deregulation and the establishment of a wholesale market is expected to encourage the development of co-generation.

A competitive market for generation is expected to result in lower environmental impacts because of the ability of small-scale and renewable generation plant, and ESCOs, to enter and displace large central plants which were poorer environmental performers.

Transmission

In 1994 Trans Power was separated from ECNZ and established as a stand-alone, state-owned enterprise. The grid was opened up to wheeling. Trans Power is presently involved in establishing an efficient

pooling mechanism for the wholesale market, to be introduced in 1996. The government has recognized that, where there is more than one generator, a neutral and transparent 'pooling' mechanism is required to ensure least-cost co-ordination of dispatch and back-up generation.

Transmission charges rose dramatically, in line with a nearly four-fold increase in the valuation placed on the transmission assets. This has resulted in incentives to build local generation and bypass the grid, which, in turn, leads to higher back-up transmission charges.

Distribution

There are 47 local distributors and retailers. Proposals for compulsory privatization were amended to allow the essentially municipal owners to select ownership structures of their own. About half of the companies are owned by majority trusts, about a third are majority owned by local councils and six are majority owned by consumers, electors or other shareholders.

The proponents of privatization argued that having consumers as shareholders would mean that company decisions would be based on the dual criteria of consumer interest and efficient commercial management. Advocates of trusts saw them as preserving an essential community asset in the community's hands in perpetuity. For most of the companies that adopted trust structures, ownership remains as it was at the time the trust was established. Privatization has not resulted in preserving ownership in the hands of consumers, since more than half of consumer shareholders have sold.

Trust companies are expected to merge to maintain their competitive positions. A series of regional groupings have formed, driven by the need to manage sophisticated wholesale purchasing

arrangements. As the market develops, co-operation and strategic alliances are expected to grow stronger.

Mercury Power is the biggest retailer in New Zealand and is making the move from a distribution to a vertically integrated company. The completion of two new generation plants under construction will make Mercury the second or third largest generator in New Zealand.

Power New Zealand is the second largest electricity supply company in New Zealand and operates in two high electricity growth areas. Last year it increased

prices to domestic consumers by 12.5% (inflation stood at 2-4%).

Retail Access

- unavailable to most customers.

Regulation

Light-handed regulation involving information disclosure is being applied under the Commerce Act, for wholesaling, transmission, distribution and retailing. Cross-subsidies between commercial and domestic consumers, and between urban areas and remote or rural areas, have been substantially reduced.

Q & A



Municipal Electric Association

**RESPONSES TO
COMMITTEE WORKING PAPER**

Submission to the
**ADVISORY COMMITTEE ON COMPETITION
IN
ONTARIO'S ELECTRICITY SYSTEM**



INTRODUCTION

In late 1995, the *Advisory Committee* issued a Working Paper which identified an extensive series of questions awaiting the consideration of the *Committee*. In order to assist the *Committee* in its deliberations, the MEA has prepared specific responses to these queries. More detailed explanations of arguments and evidence may be found in the various documents the MEA has submitted.

PRESSURES FOR CHANGE

Q. What are the economic, technological and public policy trends facing Ontario Hydro and the provincial electricity system?

A. Key economic trends are:

- low natural gas prices make independent power production more attractive;
- globalization of the economy has led many industrial and commercial customers to seek ways to reduce their operating costs;
- greater uncertainty in load forecasts favours short-lead-time, low capital cost, smaller-scale generation.

Key technological trends are:

- advances in combined cycle generation have reduced minimum efficient scale in generation to the point where self-generation, non-utility generation, and cogeneration have become both feasible and attractive;
- innovations and rapidly dropping costs in information technology have several important implications for the electricity industry:
 - coordination problems related to transmission of electricity from multiple suppliers have largely been resolved, facilitating vertical unbundling of the electricity industry;
 - there is potential for product innovation in energy services and the delivery of multiple infrastructure services by a single provider;
 - the 'wires' have become the most important strategic asset because they allow access to the customer; as such, they have also become the target for take-over.

Key public policy trends are:

- vertical unbundling has occurred in a number of electricity industries around the world; it has also been a central feature of restructuring of natural gas and telecommunications industries;
- while initially there was considerable interest in retail access, many jurisdictions have either rejected it, retreated from it, or are implementing a version which does not achieve the original objectives; regulators and many industry stakeholders have come to the realization that retail access is still a theoretical concept with many unresolved technical issues; most jurisdictions are taking a 'wait and see' attitude;
- municipalization is continuing in a number of jurisdictions; in the U.S., a number of municipalities are seeking to create their own utilities in order to obtain better electricity rates; in Germany, where there are over 800 municipal utilities, consideration is being given to adding another 100-150;
- privatization of electric utilities and other industries has occurred in a number of countries; privatization of hydraulic generation, which has been viewed as a 'heritage' asset, has generally not been undertaken even in the presence of restructuring; nor have nuclear assets been privatized as of

yet; in Ontario, public concern over safety would need to be taken into account in any privatization of nuclear generation;

- broader public policy trends have included liberalization of trade, decentralization, and devolution of power to lower levels of government, (municipalization is consistent with these trends);
- these decentralizing forces stand in contrast to growing environmental concerns which usually require some form of centralized action; long term environmental concerns may restrict reliance on fossil-fuelled generation.

BARRIERS TO CHANGE

Q. What are the barriers to change?

- A. The single most important institutional obstacle to change is Ontario Hydro's enormous monopoly power. The corporation not only controls virtually all generation and transmission in the province, but it also distributes almost 30% of the electricity. The company regulates its own rates and its sheer size (by some measures it is the largest electrical utility in North America) gives it immense economic, political and financial clout. A holding company structure cannot remedy this problem.

Two other important barriers to change are:

- Ontario Hydro's excess generating capacity and the potential for stranded assets;
- the long-term debt of Ontario Hydro (\$35 billion).

POLICY DRIVERS

Q. What are the policy drivers that should guide the *Advisory Committee* recommendation? Are there other policy considerations that should guide the *Advisory Committee*?

The single most important objective should be to maximize consumer benefits. Any changes that are recommended should be fair and equitable to all customer groups and should take into account a variety of Ontario-specific issues while building on strengths indigenous to the Province. Given that electricity is essential in everyday life, reliability and the obligation to serve and supply should be preserved.

Beyond this, the other objectives, as identified by the Committee, are:

- to preserve the financial soundness of Ontario;
- to safeguard Ontario's quality of life;
- to remove barriers to growth;
- to enhance provincial competitiveness;
- to ensure that Ontario Hydro and the provincial electricity system can meet the competitive challenges of the 21st century;
- to enhance the efficiency of the electricity distribution system;
- to respond to changing technological trends in the electricity sector;
- to respond to changing international economic trends in the electricity sector.

AREAS FOR REFORM

The Advisory Committee is specifically charged with investigating options for phasing in competition by structural changes (unbundling), including options to enhance the efficiency of the electricity distribution sector. The Committee is also to examine enhancing competition through regulation and private equity.

Low rates and safe, reliable supply are the top priorities for electricity customers. Electricity is an essential service for most users. As a means of supporting these objectives over time, and in light of the pressures for change discussed above, the three main areas for reform of Ontario's electricity system are:

- *Competition (and the consequential Industry Restructuring)*
- *Ownership*
- *Regulation*

I. COMPETITION / INDUSTRY RESTRUCTURING

Many believe that competition is a means of disciplining costs and investment decisions. There are a number of options available for introducing market forces into the provincial electricity system. These range from encouraging greater competition among Ontario Hydro and a number of private generators to supply a power pool, through to "retail competition" where all individual electricity users would be able to choose their own supplier. Retail competition also requires the distribution system to be open to all users. Key issues related to competition and industry restructuring include:

Competition in generation:

Ontario Hydro's generation consists of hydroelectric, fossil and nuclear power. Hydroelectricity provides approximately 25 percent of the province's electricity supply. Nuclear power supplies over 60 percent of Ontario's electricity. In addition, there are a number of independent power producers operating in the province.

Monopoly:

Q. Is generation a natural monopoly? If not, why should the current generation monopoly be maintained? What options are available to the current generation monopoly to meet competitive challenges?

A. Generation is no longer a natural monopoly and should not be maintained. A number of technological and economic reasons have resulted in this change. The rapid increase in the price of electricity during the early 1990s, (despite Ontario Hydro's efforts, the real price of electricity is still substantially above levels prevalent during the 1980s), and the continued low price of natural gas, have enhanced the appeal of self generation, cogeneration and fuel substitution. Medium scale, non-utility generators and industrial generators are in a position to compete with traditional utilities. Lower load growth and greater uncertainty about future demand favours smaller, short-lead-time facilities since such facilities can better match load growth and involve less capital risk.

In order to meet competitive challenges, Ontario Hydro must focus on its core business, the most important element being safe and efficient operation of its nuclear reactors, and it must continue reducing costs and paying down its debt.

Q. How can the current generation monopoly be changed to ensure competition among Ontario Hydro generation and private generation?

- A. Several key changes are essential. First, Ontario Hydro's monopoly over electricity supply in the province must be ended. Second, transmission and distribution must be completely separated from Ontario Hydro. These are natural monopoly components of the industry and control of these should reside in separate entities. Third, in order to level the playing field amongst generators, Ontario Hydro should be relieved of its obligation to ensure that adequate supply is available, and this responsibility should be transferred to distributing utilities. (We note that Sault Ste. Marie PUC and Cornwall Electric do not purchase power from Ontario Hydro and already have the obligation to serve and supply.)

Prospects for competition elsewhere:

Q. Where is the competition for Ontario Hydro?

- A. Competition comes from a number of sources. First, some large industrial customers are in a position to build their own generation. Second, there is continued significant potential for fuel substitution (principally towards natural gas) in a variety of end-uses. Third, capital investments, such as more efficient motors and insulation, constitute substitution of an alternate factor of production (capital). Fourth, in some cases, lower energy prices in other jurisdictions may cause energy intensive industrial users to move, or not locate in Ontario in the first place.

Q. Do you expect Ontario's electricity system to face retail competition as well as significant rate reductions from neighbouring U.S. states and if so, how quickly? Will Quebec and Manitoba move to a retail competitive market in the foreseeable future?

- A. Retail access, that is, access to alternate suppliers for *all* customers, is unlikely to be a reality in most jurisdictions in North America in the near future. The prior regulatory compact between producers (and their owners), regulators and electricity users, has created a circumstance where costs associated with stranded assets must be shared amongst various stakeholders. The realization that, for a variety of technical reasons, retail access will favour large industrial customers at the expense of smaller customers, has also come to the attention of regulators and legislators.

While there was initially considerable interest expressed in retail access, a number of states in the U.S. are now retreating from it. Some states are introducing pilot projects, but decisions on implementation would only come after careful consideration and assessment of results as well as thorough consultation with all stakeholders. California appears to be the most ambitious in its efforts to move to retail access, but even there, formidable technical problems remain and the timetable has been repeatedly delayed.

On the other hand, the two issues that dominate virtually all discussions of restructuring in the U.S. are vertical separation of traditional monopolistic utilities with the objective of reducing or dismantling their monopoly power, and the recovery of costs associated with stranded assets.

Quebec, which operates a traditional vertically integrated monopoly, is unlikely to permit either transmission or distribution access in the near future. Nor is there any evidence that Manitoba will introduce retail access. However, if it should consider doing so, stranded assets would most likely not be a problem because of the presence of a large supply of indigenous, low cost, hydraulic power. In British Columbia, the Utilities Commission, the B.C. Energy Coalition and B.C. Hydro have rejected retail access, as has Alberta.

In Ontario, retail access does not serve the public interest and should not be implemented for a number of reasons:

- *Stranded Assets*: Ontario Hydro has very substantial debt obligations associated particularly with its nuclear facilities. Under retail access, there is serious risk that uneconomic bypass, especially by large industrial customers or by municipal utilities, would occur, seriously threatening the financial viability of existing assets.
- *Irreversibility*: Once retail access is permitted, it must be available on a non-discriminatory basis to all suppliers including those in the U.S. The large number of private contracts that would be put in place (in some cases with international parties) would be very difficult to reverse.
- *No Reciprocal Right of Access to U.S. Markets*: Reciprocity is not a requirement of the North American Free Trade Agreement (NAFTA). In particular, there would be no reciprocal right of access by Ontario producers to U.S. markets, should there be retail access in the Ontario electricity market. Thus, Ontario could suffer significant stranded assets as excess U.S. capacity is unloaded here.
- *Equity Considerations*: Availability of retail access to large industrial customers without similar opportunities for residential and other small customers, could result in an unfair transfer of costs to the latter. Permitting some customers to leave without 'making the system whole', penalizes those that are captive.
- *Loss of Economic Dispatch*: Currently the transmission system operator (Ontario Hydro) determines the output of different generators in order to minimize overall system costs. Implementation of retail access could lead to the loss of such benefits.
- *Obligation to supply would disappear*: Under retail access, market forces would need to be relied upon to ensure that adequate supply is available. This may be politically unacceptable as many customers would fear that supply could be inadequate.
- *Costs of Retail Access*: Generation supply accounts for the dominant portion of electricity costs -- about 70% in Ontario. Retail supply, typically accounts for less than 3%. (Remaining costs are for transmission and distribution.) Vigorous competition at the wholesale level will exhaust most competitive benefits. Any benefits of extending competition to the retail level are questionable and limited by the relatively small proportion of final price that corresponds to the retail supply business. Furthermore, they would likely be outweighed by the additional transactions costs that end-use customers would incur in procuring their needs through marketers and brokers. Indeed, metering costs and other technical problems make implementation of retail access for all customers impractical.

Q. Is there any benefit in opening up the Ontario market in advance of the opening of markets in the U.S.?

- A. Ontario has significant excess capacity at this time and, until it is absorbed, there is little benefit to permitting such access. Retail access would provide opportunities for U.S. suppliers to 'cherry pick' and to unload excess capacity within the Ontario market without reciprocal rights or opportunities for Ontario Hydro in U.S. markets.

Q. What are the impacts of international trade agreements and NAFTA?

- A. An important aspect of international trade agreements and NAFTA that is often overlooked is that the opening of domestic markets to foreign suppliers does not ensure reciprocal access to foreign markets for domestic producers.

On the other hand, trade agreements typically require that *foreign* firms receive the same treatment as *domestic* firms. Thus, providing transmission access to Ontario suppliers, would create a similar right for foreign producers.

Timing / Urgency:

Q. How quickly are changes needed?

- A. The current excess capacity and reasonable electricity prices in Ontario (in comparison to most U.S. jurisdictions) allows Ontario the luxury of proceeding with a prudent approach to restructuring. Necessary changes can be brought about in an orderly fashion over the course of the next few years. Nevertheless, in order to provide Ontarians with the best electricity future, certain actions must be undertaken immediately. Most important among these is vertical unbundling and the appointment of a regulator to oversee restructuring.
- Q. Is there an advantage to introducing greater competition in phases? If so, should competition be phased in by size of customer (e.g., large, commercial, small), by type of customer (wholesale first, then retail), or by type of market (competition for new generators only at first)?
- A. Competition should be phased in to avoid uneconomic bypass. Of necessity, this implies gradually opening entry into the market. The MEA proposes that competition be at the wholesale level, where suppliers compete to supply the pool, which would be operated by the transmission company. (An incremental approach to retail access would inevitably create disparities and inequalities in that large customers would be afforded the best opportunities, while small customers would be burdened with any residual costs such as those associated with stranded assets. Such has been the case at Bonneville Power in the Northwestern U.S.) The timing proposed by the MEA is as follows:

Phase I: January 1, 1997

On January 1, 1997 the following elements would be implemented:

- a separate publicly owned transmission company would come into being; the obligation to procure adequate supply to meet provincial needs would transfer to the transmission company;
- a separate generating company consisting of Ontario Hydro's hydraulic, fossil and nuclear businesses would come into being;
- a separate distribution company servicing Ontario Hydro's current retail customers would come into being;
- a separate company consisting of OHII and OHT would come into being;
- a provincial regulator would begin serving an initial three-year term to oversee the transition period.

Transition Period

During the transition period, the following changes would take place:

- the generating company would reduce its debt in preparation for full competition;
- the distribution segment of the industry would undergo restructuring and prepare to meet its forthcoming obligations;
- horizontal de-integration of the generation company would be considered; possibilities for privatization of portions of generation, OHII and OHT would be considered.

Phase II: January 1, 2000

On January 1, 2000 the remaining elements would be implemented:

- the obligation to procure adequate supply would rest with distribution companies;

- contracts for supply between distributors and the transmission company and the transmission company and suppliers would commence;
- full competition in generation supply would commence; the transmission company would be free to purchase from least cost suppliers.

Degree of competition:

Q. Should there be competition among all suppliers or only among new generating capacity? Should they compete to supply a common power pool, wholesalers (e.g., municipal utilities), or be able to sell directly to customers?

A. After the transition period, competition should be among all generation suppliers to the power pool.

Rate impacts:

Q. What would be the impact on prices paid by customers? Would large customers get more of the benefits because of their bargaining power? Would medium-sized or small businesses be able to band together and get lower prices? Would small customers with less bargaining power be able to get much of the benefits? Would customers with less bargaining power (e.g. residential and northern Ontario) be stuck with the stranded costs that other customers escaped?

A. Under the MEA model, all customers would benefit from lower rates that result from competition. No specific group would stand to benefit disproportionately. The bargaining power of all customers would be concentrated in a single entity -- the pool purchaser -- thus maximizing pressure on suppliers. All large customers would be served by distributing companies.

Q. Would variable regional rates replace postage stamp rates (a common wholesale price regardless of where you live)?

A. Under the MEA model, the pool would offer wholesale prices which would not depend on location within the province. At any point in time, the menu of contracts available to all distributors would be the same, reflecting current costs of power acquisition. Pooling of costs would continue, both in the short-term market and the long-term market, thus ensuring rate equity and risk mitigation.

Stranded assets:

Q. If, as a result of competition, Ontario Hydro's revenues fall so that it can no longer service its \$35 billion debt, the government will be required to recover these costs from taxpayers or pass them through to ratepayers. Who should pay?

A. The current state of public debt accumulated through past excesses, makes it unlikely that the government would be in a position to absorb any significant portion of Ontario Hydro debt. If Ontario Hydro were unable to service its debt, rates would in all likelihood be increased. Should this happen subsequent to the advent of competition, the regulator could impose transmission charges to recover such costs.

Competition and subsidies:

Q. How will areas with fewer economic advantages be served? Electricity rates for rural residential customers are currently subsidized by Ontario Hydro's other customers at a cost of \$120 million per year. As well, to ensure that certain large industrial customers stay in Ontario and/or on the Ontario Hydro system, Ontario Hydro offers power at prices below the average cost of production. Should such arrangements be continued in the future?

- A. Under the MEA model, the obligation to serve and secure adequate supply will reside with distributing utilities, so that there would be no concern about security of supply.

There appears to be considerable support amongst rate-payers for rural rate assistance. However, the government will ultimately need to decide whether such support should continue. In any case, clear rules should be established for the provision of subsidies or for the provision of other uneconomic services, (such as demand side management programs that are not self-financing). Financing mechanisms should also be clearly specified.

During the transition period, there may be a need to continue with the present practice of offering retention rates to certain customers in order to avoid uneconomic bypass or departure from the province. Such circumstances would be adjudicated on an individual basis by the electricity regulator.

Viability of competition:

- Q. Is it possible to create a number of generators that will result in competitive prices for Ontarians and viable competitors in the North American market? What is the optimum number of companies required to ensure a competitive market?
- A. It should be possible to create multiple competing nuclear, fossil and hydraulic generating companies. Experience elsewhere indicates that a minimum of 5 generators is required in order to avoid anti-competitive behaviour.
- Q. In the U.K., the system was reformed to remove the public monopoly structure. Recently there has been some reconsolidation as the generators have begun to buy up distribution companies. If a competitive market is created, what should be done to maintain its competitive nature? Are arrangements necessary for new entrants?
- A. Re-integration of natural monopoly components of the industry with competitive components is undesirable. A simple remedy, and one that is a central feature of the MEA proposal, is to have the natural monopoly components remain in the public sector. Re-integration, for the purposes of creating market power, should not be permitted.

Legislation should provide for strict limitation on market power. Mergers should require approval of the electricity regulator and/or other regulatory authorities. There should be free entry into the generation supply market.

Obligation to serve / reliability:

- Q. In an open market, who is responsible for ensuring the adequate supply of electricity; who acts as a supplier of last resort (of this essential service) if a contract falls through?
- A. In a truly open market, no entity has an obligation to supply beyond its contracted amounts. Under the model proposed by the MEA, the responsibility to ensure adequate supply would reside with distributing utilities.

Security of supply:

- Q. Current legislation requires Ontario Hydro to ensure supply that is adequate to meet domestic needs. In a competitive market, electricity would likely be freely traded between Ontario, other provinces and the U.S. This could mean that Ontario customers could become dependent on supplies from outside Ontario or Canada, raising concerns with respect to energy security. Is this a concern?

- A. In times of shortages, political pressures mount to ensure that domestic needs are met first. If Ontario does not produce sufficient quantities to meet most of its own needs, security of supply could be a concern.

Natural gas experience:

- Q. What have we learned from the natural gas deregulation experience to assist our examination of similar issues in the electricity sector?**
- A. The single most important lesson that can be gleaned from the natural gas experience is that separation of competitive components of the industry from natural monopoly components is an essential step in the creation of competitive markets.

Role of transmission:

Ontario Hydro operates as a transmission monopoly, as well as a generation monopoly. Its Electricity Exchange purchases electricity from Ontario's generation units, independent power producers, and other utilities as needed. The Exchange pools costs and resells at average costs (the common wholesale price) to municipal electric utilities (72 percent), Ontario Hydro retail utilities (14 percent), large industrial customers (14 percent), and occasionally to other utilities and other jurisdictions. The transmission sector includes the power pool and exchange.

Monopoly:

- Q. Is the electrical transmission system a natural monopoly? What options are available to the current transmission monopoly to meet competitive challenges?**
- A. The transmission system is a natural monopoly, and as such does not face significant competitive challenges at this time. In the event of sizable increases in transmission charges, (these could arise from a stranded asset surcharge), transmission could face by-pass risk as some customers seek alternative means of meeting their electricity needs.

Access:

- Q. What are the implications of transmission access?**
- A. Transmission access could lead to stranded generation assets, loss of economic dispatch and unfair rate impacts.
- Q. Are there unique characteristics of electricity that have to be taken into account in permitting access to the transmission system? What extent of transmission access is appropriate: for example, restricted access, controlled access, or full access (the transmitter as a common carrier)?**
- A. Electricity flows according to Kirchoff's laws, following paths of least resistance, therefore the actions of one generator or customer affect the flow and impacts on others. In order to maximize efficiency, economic dispatch is required to minimize overall system operating costs. Unrestricted transmission access would likely reduce the efficiency of system dispatch.

Rate Impacts:

- Q. What would be the impact on prices paid by customers?**
- A. With transmission access, smaller business customers as well as residential customers could be burdened unfairly with costs incurred on behalf of all customers.

Power Pool / Exchange:

- Q. A power pool offers electricity at a common average price. An exchange would permit retail dealings. What is an effective mechanism to supply electricity? Who should operate the power pool or exchange?**
- A.** The presence of a wholesale electricity pool will provide equitable access to reasonably priced electricity to all distributors and hence to all end-use customers. It will also act as a vehicle for pooling risks associated with uncertainties in the price and availability of electricity. Since the bargaining power of all customers would be concentrated in the pool, which would solicit competitive bids for new supply, pressure on suppliers would be maximized.

The transmission company should operate the wholesale market for electricity. Under this arrangement, each distributor will forecast requirements and arrange contracts of varying duration with the pool operator. The pool operator will then aggregate the demands and arrange matching supply contracts through a competitive bidding process. The transmission company will offer common wholesale prices to distributors with similar contracts to ensure equity. The pool operator will also operate a spot market for electricity in order to satisfy any un-contracted demands. It is expected that distributors will seek to satisfy most of their needs through long-term contracts.

- Q. Are there problems if Ontario Hydro operates the power pool or exchange - for example, self dealing? What are alternatives to a power pool or exchange?**
- A.** In order to avoid self-dealing and cross-subsidization, Ontario Hydro should not operate the power pool or exchange. The transmission company, which would have no affiliation to generation, should operate the power pool.

Role of distribution:

Over 300 municipal electric utilities own and operate the local distribution systems, distribute over 72 percent of electricity sales of Ontario Hydro, and account for an average 15 percent of the delivered cost of electricity. Ontario Hydro retail serves 950,000 customers through 13 regional systems. Ontario Hydro serves directly 100 large commercial and industrial customers. In addition, there are six other electric utilities -- Canadian Niagara Power Company Ltd., Cornwall Electric, Falconbridge Ltd., Gananoque Light and Power Ltd., Goldcorp Inc. (formerly Dickenson Mines), and Great Lakes Power Limited.

Monopoly:

- Q. Is the distribution system a natural monopoly? What are the inefficiencies in the current distribution system? How can the efficiency of the existing distribution system be enhanced? What options are available to the current distribution monopoly to meet competitive challenges?**
- A.** Distribution is a (local) natural monopoly. A study performed by the *Coopers and Lybrand Consulting Group*¹ found no significant unexploited returns to scale in the distribution sector. It did find potential for improving productive efficiency.

¹ Municipal Electric Association / Ontario Hydro Joint Study into Retail Electricity Service in Ontario -- Interim Report (Toronto: 1994)

The distribution system can be enhanced by performing further cost studies to determine potential for efficiency gains. Restructuring can be brought about by putting in place incentives and drivers. Principal among these should be:

- the requirement for distributors to fulfil new responsibilities, in particular, the obligation to serve and supply and evolving responsibilities in the area of energy services;
- forecasting and contract negotiation responsibilities that will be undertaken by distributors;
- the requirement that all municipal distributors expand to their municipal boundaries;
- scale economies, i.e. the potential for cost savings through amalgamation / cooperation with neighbouring utilities;
- scope economies, i.e. the potential for cost savings through consolidation of electricity distribution with other services such as water, sewage and other infrastructure services;
- the preferences, desires and values of local customers and communities;
- accountability to the customer and the local community;
- reliability and customer service.

Mergers:

- Q. Municipal electric utilities could either be merged into Ontario Hydro or into regional distribution utilities. What are the consequences and benefits of having a merged distribution utility? If regional utilities were created, what is the optimal number and how should they be designed.**
- A.** Merger with Ontario Hydro would be fundamentally anti-competitive, would strengthen the (already formidable) monopoly power of Ontario Hydro and would require regulatory contortions to protect the consumer. Nor will a merger solve Ontario Hydro's financial problems, but merely disguise them. The independence of the municipal electric utilities and the threat that they might seek supplies elsewhere strengthens the incentives for Ontario Hydro to improve efficiency and to put its financial house in order. The objective should be to maintain pressure on the generation side of the business through the municipal electric utilities and their customers.

The creation of large regional distributors does not serve the public interest. Such arrangements eliminate local accountability; they increase monopoly power of distributors with no demonstrable compensating benefit; they impair the ability of the regulatory authority to use yard-stick regulation / competition; and, they would be difficult to reverse.

The optimal number of distributors cannot be determined without further assessment. However, analysis to date, as contained in the *Coopers and Lybrand Study*, as well as results from other countries, rules out a model where distribution would be performed by a small number of regional distributors. Such an arrangement would be both scale inefficient and inefficient from a productivity point of view. The net result would be *higher not lower* customer costs. The single distributor model is, *a fortiori*, detrimental to the customer interests.

- Q. Municipal utilities could also be merged with the transmission system. What are the consequences and benefits of such a merger?**
- A.** Transmission is a natural monopoly at the *provincial* level. Distribution is a natural monopoly at the *local* level. Creation of a single 'wires' monopoly would sacrifice local accountability and responsiveness to local needs. On the other hand, multiple distribution companies would exert pressure on the transmission company, (as they do today on Ontario Hydro). And, since different distributors face different opportunities, they would exercise differential pressure on the generation segment of the industry. Such pressure would be lost in a merger. Finally, the option for 'yard-stick regulation / competition' in the distribution sector would disappear.

Unless the objective is systematic accumulation and augmentation of monopoly power, there is no reason to create monopolies that are larger than their natural boundaries. The natural boundaries of distribution are much smaller than for transmission.

Q. How should other electric utilities be treated in any restructuring of the municipal utilities?

- A. After the distribution function has been completely separated from Ontario Hydro, the distribution segment of the industry should undergo restructuring. Distribution currently performed by Ontario Hydro should be assumed by existing and new local distributing utilities. Responsibility in remote and unorganized territories should devolve to separate, unrelated, independent, customer-governed utility commissions that will operate under the same conditions that apply to all utility commissions.

Access:

Q. What are the implications of access to the distribution system? What extent of distribution access is appropriate?

- A. Distribution access is inappropriate at this time. The reasons, which have been stated above include potential loss of economic dispatch, inequitable distribution of costs, risk of stranded assets and increased potential for uneconomic bypass.

Rate impacts:

Q. Is there significant potential scope for cost savings through rationalization of the municipal electric utilities? Given variations in electricity rates among neighbouring municipalities, should mergers among municipal utilities be encouraged?

- A. The *Coopers and Lybrand Consulting Group Study* into the retail sector found limited evidence of scale efficiencies through rationalization. Controllable distribution costs per customer declined moderately as the size of the utility increased to the range of 16,000 to 32,000 customers. Then costs per customer increased as scale increased. While there is a large number of very small utilities (well over 200 serve fewer than 4,000 customers), over 75% of municipal customers are served by utilities with a customer base exceeding 20,000. This is not to say that mergers could not result in scale economies. But the evidence in the study demonstrates that large distribution utilities do not have lower unit costs than medium-sized utilities.

Two other sources of savings need to be explored further. Scope economies can be realized through expansion of service by utilities, and productivity improvements can be implemented without restructuring. (The *Coopers and Lybrand Consulting Group Study* did identify significant potential for the latter.)

Mergers that are undertaken voluntarily would not be expected to raise rates for any of the parties.

Compensation:

Q. If municipal electric utilities were to be merged with Ontario Hydro or into regional utilities, who should be compensated, and how should the level of compensation be determined?

- A. Municipalities should be compensated for the full replacement costs of expropriated assets.

Competition in retail:

The municipal electric utilities, which own and operate the local distribution systems, sell the electricity to customers in their respective areas and provide other energy services. Ontario Hydro also serves customers (large customers directly and customers through its regional systems). In addition, the six other electric utilities also sell electricity.

Opportunity for competition:

- Q. Where is the competition for current retailers of electricity? Who would be the new retailers in an open market? Is there a role for municipal electric utilities? Is competition necessary in the retail market? What options are available to the current retail system to meet competitive challenges? Is there a role for competition in providing other energy services?**
- A.** First we must distinguish between distribution and retail supply. In Ontario, distribution accounts for about 15% of electricity costs. Retail supply accounts for a very small proportion of the final price of electricity. (In the U.K., retail supply accounts for about 3% of costs.) The MEA model proposes that yardstick competition be the regulatory tool for controlling distribution costs. The MEA does not support retail access for various reasons that have been detailed above. The risks and costs far outweigh any potential benefits that may accrue to additional pressure on a cost component that accounts for less than only 3% of the total. Competition at the *wholesale* level, (generation costs represent about 70% of total costs), which the MEA strongly endorses, should exhaust most of the benefits of competition. Energy services, which under the MEA model, could be provided by private or public firms, would face competition.

Customer concerns:

- Q. What are the benefits of retail access? Do customers of all sizes benefit equally? Will a new customer be able to access the system at a fair price? Who will act as a supplier of last resort of this essential service? Who will monitor quality of service? What would be the impact on prices paid by consumers?**
- A.** Under retail access, the largest customers could benefit at the expense of smaller customers. There would be no supplier of last resort under retail access as the obligation to supply would disappear.

Minimum quality standards would need to be put in place, (as has been done in the U.K.) and enforced by a regulator. With respect to retail access, the quality of service would likely deteriorate. Prices paid by smaller customers would rise.

Environment:

- Q. What effect will retail access have on demand management and integrated resource planning?**
- A.** Integrated resource planning would not be possible with retail access. Clear rules would need to be established for the development, implementation and financing of demand side management programs that are not self-financing. One option for the latter would be to pay for these through a transmission charge.

II. OWNERSHIP

The current system of public ownership features lower financing costs, no corporate income taxes, and grants in lieu of property taxes paid to municipalities. Private independent generators are currently subject to these taxes, and their cost of debt could be higher. Privatization could occur in a number of different ways: for example, selling assets; issuing shares; injecting equity. Ownership issues include the following:

Ownership and competition:

- Q. Is it necessary for the industry to be privately owned to have a viable competitive system?**
- A. An element of private ownership would contribute to competitiveness within the industry, though complete privatization of generation capacity is certainly not a necessary condition. Transmission and distribution should not be privatized. Furthermore, for electricity industries, empirical evidence indicates that public power is actually cheaper than that provided by private companies.
- Q. What are the consequences and benefits of private ownership? Is it desirable for the government to continue to be involved as an investor in the generation of electrical power?**
- A. The financial simulations performed by the Financial Restructuring Group and Ontario Hydro management indicate that privatization will increase rates to customers. Indeed, the latter study concludes that a fairly modest infusion of private equity into Ontario Hydro would increase rates by as much as 30%. Unfortunately, even if nuclear generation were privatized, many of the risks (both financial and environmental) associated with this mode of generation would continue to be borne by the public sector.
- Q. Is it desirable for the government to continue to be involved as an investor in the transmission of electrical power?**
- A. The transmission system should remain in the public sector. Transmission is a natural monopoly and privatization is unlikely to convey significant societal benefits. Public ownership of transmission also protects against re-integration with competitive portions of the industry (in particular, generation) since sale and merger of monopoly assets would require consent of the government.
- Q. Should individual municipalities be encouraged to privatize their electric utilities?**
- A. Individual municipalities should be entitled to make their own decisions, as they have been in New Zealand.

Rate impacts:

- Q. What will be the impact of private ownership on power prices? Private ownership is expected to bring higher efficiencies but can't guarantee reductions in electricity rates. The U.K. generators cut their staffs in half after privatization, and cuts of 20 percent among the distribution companies have occurred. These and other potential operating cost savings may be offset by requirements to pay corporate income tax and capital taxes, and by higher financing costs. Ontario Hydro has already cut staff over 25 percent, without raising questions about safety and reliability, particularly of the nuclear plants. What are the benefits of privatization if the possibility of future savings is limited?**
- A. The essential point is that electricity prices will be low if the industry faces vigorous competition. Even publicly owned generating companies created from Ontario Hydro will become more efficient if they face competition from each other and from new privately owned entrants. Some element of widely held private ownership will propagate the incentives of private interest throughout the industry.

In the face of competition and cost cutting (as Ontario Hydro has implemented), it is imperative that nuclear safety be maintained at the highest standards. In this connection, it is worth noting that Ontario Hydro nuclear facilities, which generate the most fixed costs, have begun to show reliability problems. A number of incidents have been reported that, in the public eye, may begin to raise safety concerns. Both reliability and safety issues become more prominent as the units age. While it is difficult to benchmark appropriate levels of OM&A expenditures for a unique technology such as the CANDU reactor, current levels are below those reviewed by the Nuclear Cost Inquiry. They are also much lower (about half) than the U.S. average.

Q. With respect to the distribution sector, is there significant potential scope for cost savings through the privatization of municipal electric utilities?

- A. There is little evidence that private regulated *monopolies* result in either cost savings or lower rates relative to public sector entities. In fact, analysis of recent cost and price data of U.S. public and private electric utilities indicates that, even after adjusting for a variety of factors (including scale of operation, factor costs, access to hydroelectric sites, taxes and capital cost discrepancies), publicly owned electric utilities in the U.S. have rates significantly lower than private utilities.

Reducing public sector debt:

- Q. Ontario Hydro's debt is guaranteed by the government but is self-supporting. Privatization of Ontario Hydro would allow the utility to pay down its \$35 billion debt and reduce the government's guarantee. If proceeds of the privatization are insufficient, who will pay the deficiency: the taxpayer (by increasing the government's debt) or the electricity user (by a special levy), or the municipalities (through inadequate compensation if the municipal utilities are merged)?**

- A. Privatization cannot bring about a substantial reduction in public debt because Ontario Hydro is too highly leveraged. Estimates by the Financial Restructuring Group, which presume that municipal utility equity could be expropriated, indicate that the creation of several competing privatized generators in Ontario would produce less than \$1 billion of excess cash to be distributed to the province and to municipalities. Nor would privatization transfer nuclear risks to the private sector, which would certainly seek to limit any related financial liabilities. Although privatization and defeasance of provincially guaranteed Ontario Hydro debt would remove a large contingent liability from the Province's balance sheet, Ontarians would continue to service the debt through electricity rates.

If privatization takes place and proceeds are insufficient, it is unlikely that the provincial government would be in a position to underwrite the losses, particularly in view of its vigorous debt and deficit reduction objectives. Ultimately, the burden would be imposed on ratepayers.

Under any scenario of expropriation of municipal utility assets, municipalities should be compensated for the full replacement value.

To whom should Hydro be sold:

- Q. Privatization of all of Ontario Hydro might require foreign capital. Is it acceptable for the industry to be wholly or partially foreign owned? Should the employees and/or members of the public be able to acquire shares?**

- A. If Ontario Hydro is privatized, it would be very difficult to limit foreign ownership. There may be public opposition to foreign ownership of heritage assets such as the hydraulic facilities at Niagara Falls. However, in the event of privatization, members of the public should be permitted to acquire shares. Any sale or other disposition must be with the full consent of the original owners.

Accountability:

- Q. Is there any need for accountability between a generator, transmitter or distributor of electricity and the government? If this need exists, how can it be met?**
- A. Accountability of the transmission company to a provincial arms-length regulator is essential. Distributors should be accountable to and regulated by local governments. Generation supply would be deregulated subject to environmental control and safety standards.
- Q. How can the government be certain that there is adequate supply of electricity to meet domestic needs?**
- A. Transferring the obligation to supply to distributing utilities would ensure there was adequate supply to meet local needs. The transmission company would acquire the contractual amounts of supply on a competitive basis.

Provincial/municipal revenue impacts:

- Q. Should the privatized companies be required to pay all taxes? For the government, the payment of corporate income taxes and capital taxes will more than offset lost revenues from the debt guarantee fee (as the government-guaranteed debt is gradually eliminated). However, this increases generating costs and potential power prices. Private owners may wish a guarantee from the government that water rentals from hydroelectric plants not be raised as the rents are currently below market value. Should privatized companies have to pay full property taxes to municipalities?**
- A. Privatized generators should be subject to taxes paid by private companies.

If hydraulic facilities are to be privatized, the purchaser will undoubtedly require assurances and agreements on water rental fees. Any such agreements should not be long-term, thus allowing for re-evaluation in the future. Water rental rates should reflect the opportunity cost of this 'fuel'.

Nuclear power:

- Q. Ontario Hydro's nuclear plants are the most costly part of the Ontario Hydro system with a book value of about \$25 billion. Ontario Hydro estimates they have a market value of \$15 billion. It will take time to put in place appropriate financial structures and independent assessments to assure potential private investors that financial risks with nuclear power are manageable (and that the public will not be stuck with these costs should a privatized company go bankrupt). Should the government remain responsible for the nuclear waste and decommissioning costs or should these be passed along to the new owners? Will the private sector accept the risk and liability?**
- A. As the U.K. experience shows, privatization of nuclear facilities will be difficult. It is extremely unlikely that the private sector would be willing to accept, and be fully responsible for, the long-term risks associated with nuclear technology. Indeed, even in the short term there are severe technological (note the mothballing of Bruce Unit 2) and regulatory risks that would discourage private investors.
- Q. What are the opportunities for a merger of Ontario Hydro's nuclear generation with Atomic Energy Canada Limited? What are the consequences and benefits of such a merged nuclear entity?**
- A. A merger between AECL and Ontario's three nuclear generating stations will require further exploration. The benefits of merger (which would maintain or increase market power) must be weighed against separation into multiple (e.g. three -- Pickering, Bruce, Darlington) nuclear generating companies.

Other business operations:

- Q.** Other business operations of Ontario Hydro include: Ontario Hydro International Inc. (OHII); Ontario Hydro Technologies (OHT); and activities such as energy efficiency. Such operations may/may not be essential to the operations of Ontario Hydro as a utility company. Is it necessary for these operations to be with Ontario Hydro (or its successor(s))? What options are available?
- A.** OHII and OHT should be privatized. In its review of OHII and OHT, the Ontario Energy Board noted that the activities associated with these business units involve ratepayers making involuntary and speculative investments.

Labour:

- Q.** Ontario Hydro has already cut staff over 25 percent. Some staff are covered under federal labour legislation. Any changes to the ownership of Ontario Hydro will have an impact on its employees. How should labour issues be managed?
- A.** As a major stakeholder, labour should be part of the consultative process.

Environment:

- Q.** Can a privatized electricity industry serve public policy initiatives, such as promoting sustainable development and energy efficiency?
- A.** Generally, such policies should be separated from business activity. Electricity companies should not be the tools of public policies *per se*. Environmental objectives and sustainable development and energy efficiency policies can be implemented through regulation, internalization of externalities through the creation of property rights and through taxes.

Valuation of assets:

- Q.** What are the issues surrounding the valuation of assets? What can we learn from the U.K. experience?
- A.** In view of the substantial profits within the electricity industry, it is clear that the assets in the U.K. were under-valued at time of sale. Such has often been the case in other privatizations. Advance testing of the market, through the sale of a limited number of futures, would reduce the likelihood that assets will be sold below market value. In order to encourage competition and reduce the ill effects of market power, it is best to create a larger number of small companies rather than a few large ones, even if this reduces the sale proceeds. (Both of these points were made as early as 1983 by Professors M. Beesley and S. Littlechild in "Privatization: Principles, Problems, and Priorities", *Lloyds Bank Review*, July 1983.)

Value of current system:

- Q.** Ontario Hydro is an integrated generation and transmission company with a world-wide reputation. Is the break-up value of the utility greater than the value of the vertically integrated company?
- A.** Vertically integrated monopolies have greater market value, in some cases much greater market value, than do unbundled and separate companies. The additional market value comes principally from additional market power. It is precisely this reason that vertical unbundling serves the public interest.

- Q. The municipal electric utilities have not recommended any substantive changes to their structure. Can the current distribution system be supported on economic grounds, taking into account local needs and wishes?
- A. The MEA has made substantive recommendations on the distribution sector. First, the obligation to serve should be transferred to the distributors. This would be a formidable driver of restructuring as utilities would seek to amalgamate in order to fulfil their new responsibilities. Second, the MEA has recommended separation of the Ontario Hydro Retail / Power District from Ontario Hydro. Third, the MEA recognizes the significant potential for productive efficiency savings that were identified in the *Coopers and Lybrand Consulting Group Study*. Fourth, the MEA recognizes the potential for efficiency gains through exploitation of economies of scope.

III. REGULATION

Any changes to the structure or ownership of the Ontario electricity system will require changes in how it is regulated. Regardless of the future structure of Ontario's electricity system, to instill confidence in the sector, regulatory certainty is required. Different forms of regulation may be required for the different sectors, regardless of structure and ownership.

Where there is no or less than full competition, some degree of regulatory oversight is required. Where there is sufficient competition to ensure an efficient and equitable marketplace, no regulation is required. Regulation may be required in a transition to a competitive structure.

Issues include:

Oversight role:

Q. What role should regulation play in developing a more competitive market? Where is regulation required? Is the Ontario Energy Board the appropriate regulator?

A. A provincial 'electricity regulator' that is at arm's-length from the government and has the power to enforce decisions should be established.

The regulator should be charged with:

- ensuring a smooth transition to greater competition in generation without the creation of stranded assets;
- regulation of wholesale costs and rates during the transition period;
- ongoing regulation of transmission company costs and capital plans.

In order to minimize regulatory costs and to take advantage of informational efficiencies, it would also be desirable for the regulator to be responsible for environmental matters.

Regulatory control over distributors should reside with local commissions. This will ensure accountability to the end-use customer. Yardstick cost and performance measures should be further developed for distributing utilities to assist local commissions in their regulatory role.

Q. Should Ontario Hydro (or its successor(s)) continue to play a regulatory role?

- A. In order that the descendants of Ontario Hydro can operate effectively as competition is introduced, there should be complete separation of regulatory functions from such entities.

Type of regulation:

Q. What type of regulation should there be for each part of the industry (generation, transmission (include the power pool/exchange), distribution, and supply)? Options include: no regulation (i.e., competition); traditional cost of service (rate of return on rate base); variations on rate of return regulation (for example, "banded" allowable rate of return, "variable" rate of return, a sharing mechanism); incentive or performance-based regulation; price caps.

A. Ultimately there should be no cost/price regulation for the generation sector. Performance-based regulation should be used in the transmission segment. Distributing utilities should be subject to yardstick competition / regulation enforced by local bodies.

Q. Is it important that the same regulatory approach and the same regulator be used for electricity as for natural gas?

A. Activities of the electricity regulator should be closely coordinated with regulators of natural gas and other energy sectors.

Direct government control:

Q. Many Ontario Hydro operational decisions, as well as the activities of subsidiaries, are subject to government approval -- for example, the purchase of power and fuel for Ontario and international investment activity. What direct government approvals should be required, if any, in a competitive market?

A. None, so long as generators, operating in a competitive market, comply with relevant legislation.

Regulatory control:

Q. What type(s) of regulatory control would be needed to ensure a level playing field and provide consumer protection in a competitive electricity market? Even where regulation may not be necessary, monitoring may be advisable to ensure that a newly developed competitive market will remain competitive. For example, to prevent the U.K. reconsolidation experience, common ownership of the generation, transmission and distribution units may be prohibited; or take-over reviews may be appropriate. Should the government be able to intervene if the competitive market is not working?

A. A principal role of the electricity regulator during the transition period would be to ensure that competition is established on a fair and level playing field.

Environment:

- Q. What will be the role for regulation in sector investment in energy conservation, renewable energy, and environmental protection?**
- A.** A clear separation between market activity and environmental and public policy programs should be effected. When there is a public policy decision to promote programs that are uneconomic or incapable of sustaining themselves, clear rules should be established for the provision of subsidies. Alternatives for financing mechanisms include transmission charges and taxes.

Other regulatory needs:

- Q. Ontario Hydro has other regulatory duties. For example, it is a regulator of electrical inspections. In Alberta, this specific function is being moved from the provincial government to others (municipalities, accredited agencies). What alternatives are available to fulfil these regulatory needs?**
- A.** Such responsibilities should be moved to other bodies.









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